USDA

Dairy 2002

Part III: Reference of Dairy Cattle Health and Health Management Practices in the United States, 2002

United States Department of Agriculture

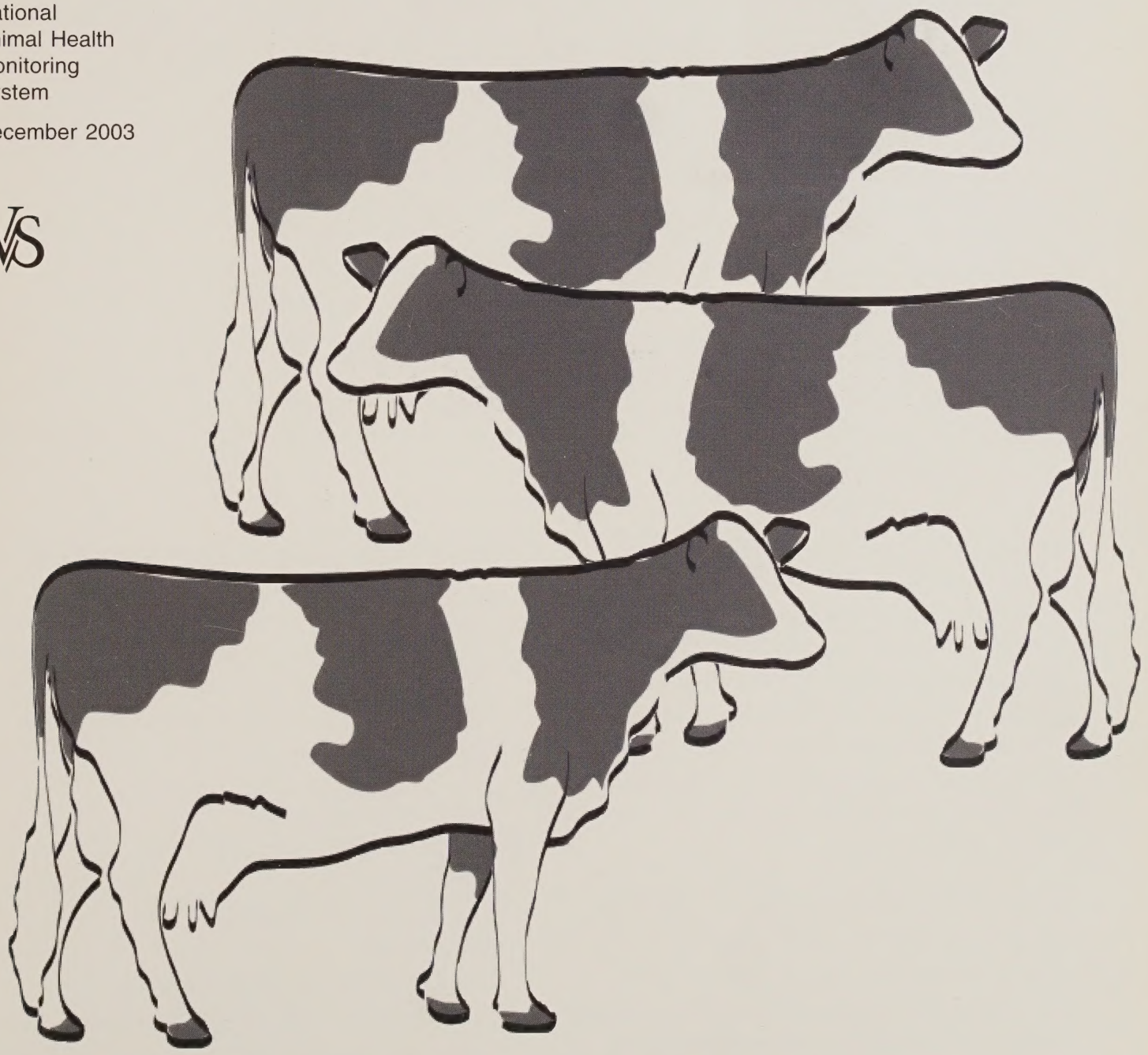
Animal and Plant Health Inspection Service

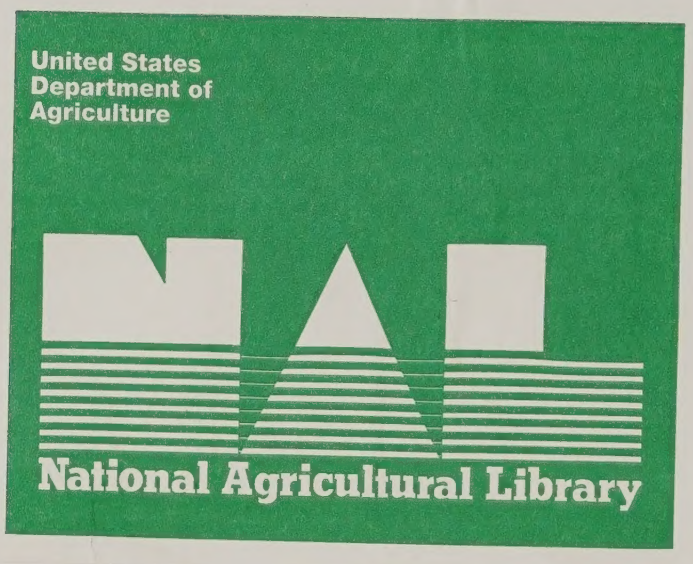
Veterinary Services

National Animal Health Monitoring System

December 2003

VS





USDA:APHIS:VS:CEAH
NRRC Building B, M.S. 2E7
2150 Centre Avenue
Fort Collins, CO 80526-8117
970.494.7000
E-mail: NAHMSweb@aphis.usda.gov
www.aphis.usda.gov/vs/ceah/cahm

#N400.1203

Acknowledgments

This report has been prepared from material received and analyzed by the U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) during a study of animal health and health management on U.S. dairy operations.

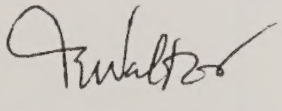
The Dairy 2002 study was a cooperative effort between State and Federal agricultural statisticians, animal health officials, university researchers, extension personnel, owners, and operators. We want to thank the hundreds of industry members who helped determine the direction and objectives of this study by participating in focus groups.

Thanks also to the National Agricultural Statistics Service (NASS) enumerators, State and Federal Veterinary Medical Officers (VMOs), and Animal Health Technicians (AHTs) who visited the operations and collected the data. Their hard work and dedication to the National Animal Health Monitoring System (NAHMS) are invaluable. The roles of the producer, A a Veterinarian in Charge (AVIC), NAHMS Coordinator, VMO, AHT, and NASS enumerator were critical in providing quality data for Dairy 2002 reports. Thanks also to the personnel at the Centers for Epidemiology and Animal Health (CEAH) for their efforts in generating and distributing valuable reports from Dairy 2002 data.

Additional biological sampling and testing were afforded by the generous contributions of collaborators for the Dairy 2002 study, including:

- USDA:APHIS, National Veterinary Services Laboratory
- USDA:ARS, National Animal Disease Center
- USDA:ARS, Beltsville Animal Research Center
- USDA:ARS, Russell Research Center
- Colorado State University, College of Veterinary Medicine and Biomedical Sciences
- BIOCOR Animal Health
- IDEXX
- The University of California, Davis
- TREK Diagnostic Systems
- Antel BioSystems, Inc.

All participants are to be commended, particularly the producers whose voluntary efforts made the Dairy 2002 study possible.



Thomas E. Walton
Director
Centers for Epidemiology and Animal Health

Suggested bibliographic citation for this report:
USDA. 2002. Part III: Reference of Dairy Cattle Health and Health Management Practices in the United States, 2002
USDA:APHIS:VS,CEAH, National Animal Health Monitoring System, Fort Collins, CO #N400.1203

Contacts for further information:

Questions or comments on Dairy 2002 study methods or requests for additional data analysis: Dr. Brian McCluskey: 970.494.7000
Information on reprints or other NAHMS reports: Mr. Brad Doty: 970.494.7000
E-mail: NAHMSweb@aphis.usda.gov

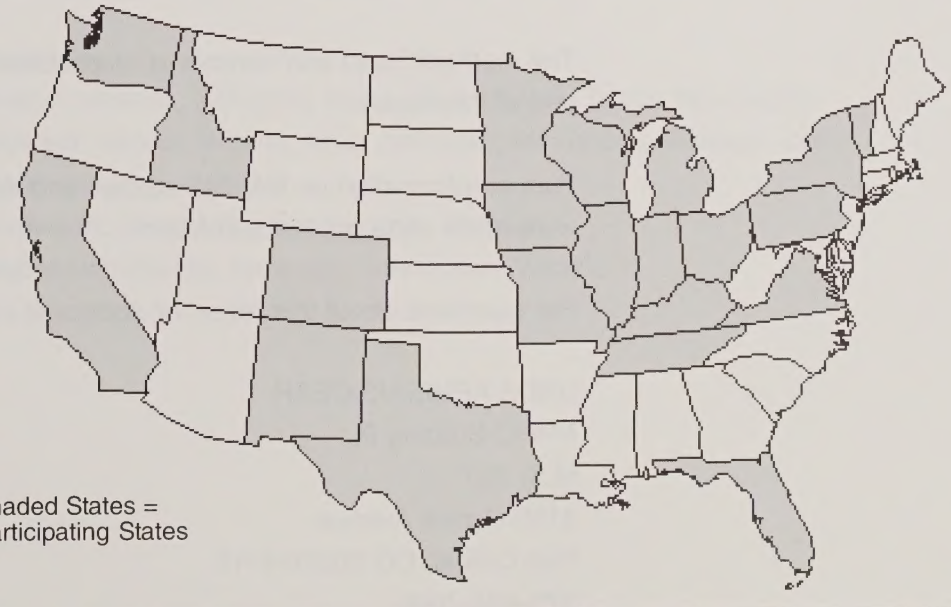
Table of Contents

Introduction

The National Animal Health Monitoring System (NAHMS) is a nonregulatory division of the United States Department of Agriculture (USDA) Animal Health Inspection Service, Veterinary Services designed to help meet animal health information needs. NAHMS has collected data on dairy health and management practices through two previous studies.

The NAHMS 1991-92 National Dairy Heifer Evaluation Project (NDHEP) provided the dairy industry's first national baseline information on the health and management of dairy cattle in the United States. Just months after the study's first results were released in 1993, cases of acute bovine viral diarrhea (BVD) surfaced in the United States following an outbreak in Canada. NDHEP information on producer vaccination and biosecurity practices helped officials address the risk of disease spread and target educational efforts on vaccination protocols. In addition, vital information on the prevalence of *Cryptosporidium parvum* and shedding by calves was available to officials and the public during a spring 1993 outbreak of related human illness in Milwaukee, Wisconsin. Later that year, another outbreak of human illness was reported in the Pacific Northwest, this time related to *Escherichia coli* 0157:H7. NDHEP data on the bacteria's prevalence in dairy cattle helped officials define public risks as well as research needs. This baseline picture of the industry also helped identify additional research and educational efforts in various production areas, such as feed management and weaning age.

Dairy 2002 Participating States



Shaded States =
Participating States

Information from the NAHMS Dairy '96 study helped the U.S. dairy industry identify educational needs and prioritize research efforts on such timely topics as antibiotic usage and Johne's disease, as well as digital dermatitis, bovine leukosis virus (BLV), and potential foodborne pathogens, including *E. coli, Salmonella, and Campylobacter.*

Part 1: Reference of Dairy Health and Management in the United States, 2002 is the first in a series of reports containing national information from the NAHMS Dairy 2002 study conducted in 21 major dairy States (see map). Dairy 2002 was designed to provide information to both participants and industry from operations representing 82.8 percent of the U.S. dairy operations and 85.5 percent of the U.S. dairy cows. Data were collected from December 31, 2001, through February 12, 2002.

Part II: Changes in the United States Dairy Industry, 1991-2002 provides national estimates of animal health management practices for comparable populations from the NAHMS 1991 National Dairy Heifer Evaluation Project (NDHEP), Dairy '96, and Dairy 2002 studies.

Part III: Reference of Dairy Cattle Health and Health Management Practices in the United States, 2002 is the third in a series of reports containing national information resulting from NAHMS Dairy 2002. Data for this report were collected from 1,013 operations with 30 or more dairy cows. State and Federal veterinary medical officers (VMOs) and animal health technicians (AHTs) collected the data between February 25 and April 30, 2002.

The methods used and number of respondents in the study can be found at the end of this report.

Further information on NAHMS studies and reports are available online at: www.aphis.usda.gov/vs/ceah/cahm

For questions about this report or additional copies, please contact:

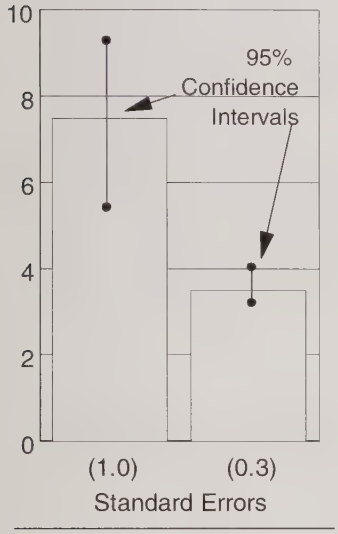
USDA:APHIS:VS:CEAH
NRRC Building B,
M.S. 2E7
2150 Centre Avenue
Fort Collins, CO 80526-8117
970-494-7000

Terms Used in This Report

Cow: Female dairy bovine that has calved at least once.

Heifer: Female dairy bovine that has not yet calved.

Examples of a 95% Confidence Interval



Population estimates: Estimates in this report are provided with a measure of precision called the **standard error.** A 95 percent confidence interval can be created with bounds equal to the estimate, plus or minus two standard errors. If the only error is sampling error, the confidence intervals created in this m anner will contain the true population mean 95 out of 100 times. In the example to the left, an estimate of 7.5 with a standard error of 1.0 results in limits of 5.5 to 9.5 (two times the standard error above and below the estimate). The second estimate of 3.4 shows a standard error of 0.3 and results in limits of 2.8 and 4.0. Alternatively, the 90 percent confidence interval would be created by multiplying the standard error by 1.65 instead of 2. Most estimates in this report are rounded to the nearest tenth. If rounded to 0, the standard error was reported. If there were no reports of the event, no standard error was reported.

Sample profile: Information that describes characteristics of the sites from which Dairy 2002 data were collected.

Total inventory: All dairy cattle present on the site on January 1, 2002.

Herd size: Herd size is based on January 1, 2002, dairy cow inventory. Small herds are those with less than 100 head; medium herds are those with 100 to 499 head; and large herds are those with 500 or more head.

Regions:
West: California, Colorado, Idaho, New Mexico, Texas, Washington
Midwest: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Wisconsin
Northeast: New York, Pennsylvania, Vermont
Southeast: Florida, Kentucky, Tennessee, Virginia

Section I: Population Estimates

A. Animal Disease Exclusion

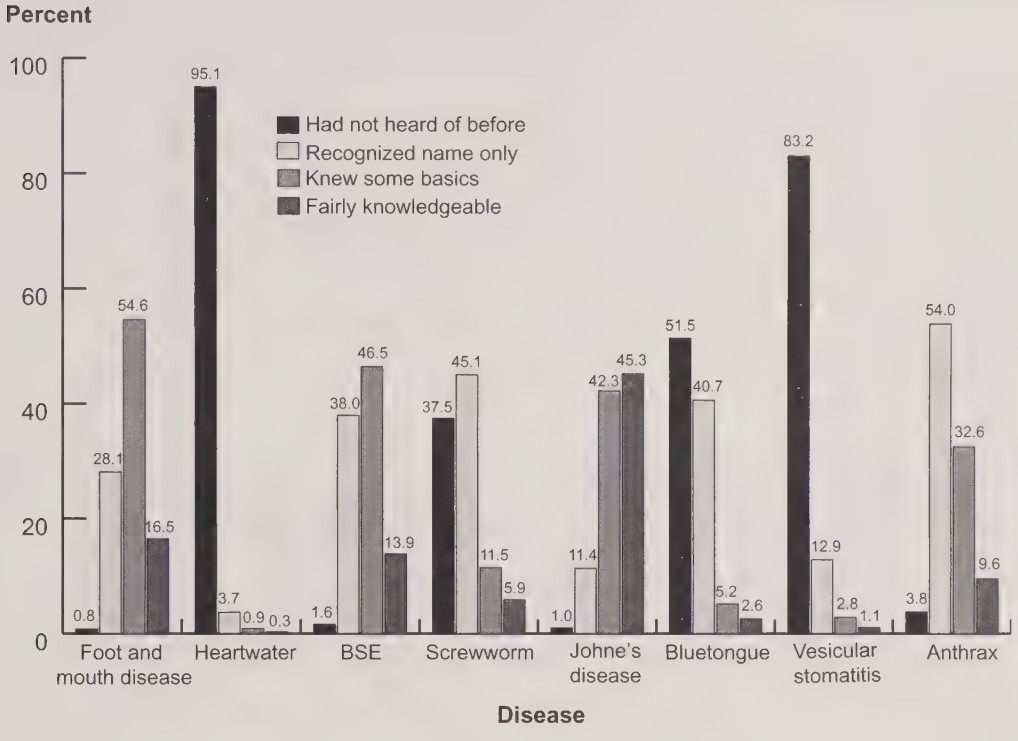
1. Producer familiarity with disease

Overall, producers were most familiar with Johne's disease (45.3 percent were fairly knowledgeable about Johne's) and least familiar with heartwater (95.1 percent had not heard of heartwater). Heartwater is a foreign infectious disease of ruminants found primarily in Africa and the Caribbean Islands. This disease is transmitted by ticks and causes fever, nervous signs, and an accumulation of fluid around the heart and in the lungs and abdomen. The highest percentage of producers (54.6 percent) knew some basics about foot and mouth disease. Anthrax was the disease recognized by most producers (54.0 percent) by name only. The differences in the level of knowledge producers have about various diseases may be explained by the level of attention a particular disease gets. For example, the industry's awareness of Johne's disease has increased over the last few years due to concentrated efforts to educate producers and control the disease. Outbreaks of foot and mouth disease and bovine spongiform encephalopathy in other countries have created international media interest, heightening awareness and strengthening efforts to prevent these diseases from entering the United States.

a. Percentage of operations by level of familiarity with specific cattle diseases:

	Percent Operations								
	Had Not Heard of Before		Recognized Name Only		Knew Some Basics		Fairly Knowledge-able		
Disease	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Total
Foot and mouth disease (FMD)	0.8	(0.3)	28.1	(1.9)	54.6	(2.1)	16.5	(1.5)	100.0
Heartwater	95.1	(0.8)	3.7	(0.7)	0.9	(0.3)	0.3	(0.2)	100.0
Bovine spongiform encephalopathy (BSE)	1.6	(0.5)	38.0	(2.1)	46.5	(2.2)	13.9	(1.5)	100.0
Screwworm	37.5	(2.2)	45.1	(2.2)	11.5	(1.2)	5.9	(1.0)	100.0
Johne's disease (paratuberculosis)	1.0	(0.3)	11.4	(1.4)	42.3	(2.1)	45.3	(2.1)	100.0
Bluetongue	51.5	(2.1)	40.7	(2.0)	5.2	(0.8)	2.6	(0.6)	100.0
Vesicular stomatitis	83.2	(1.4)	12.9	(1.3)	2.8	(0.5)	1.1	(0.3)	100.0
Anthrax	3.8	(0.8)	54.0	(2.2)	32.6	(2.0)	9.6	(1.2)	100.0

Percent of Operations by Level of Familiarity with Specific Cattle Diseases



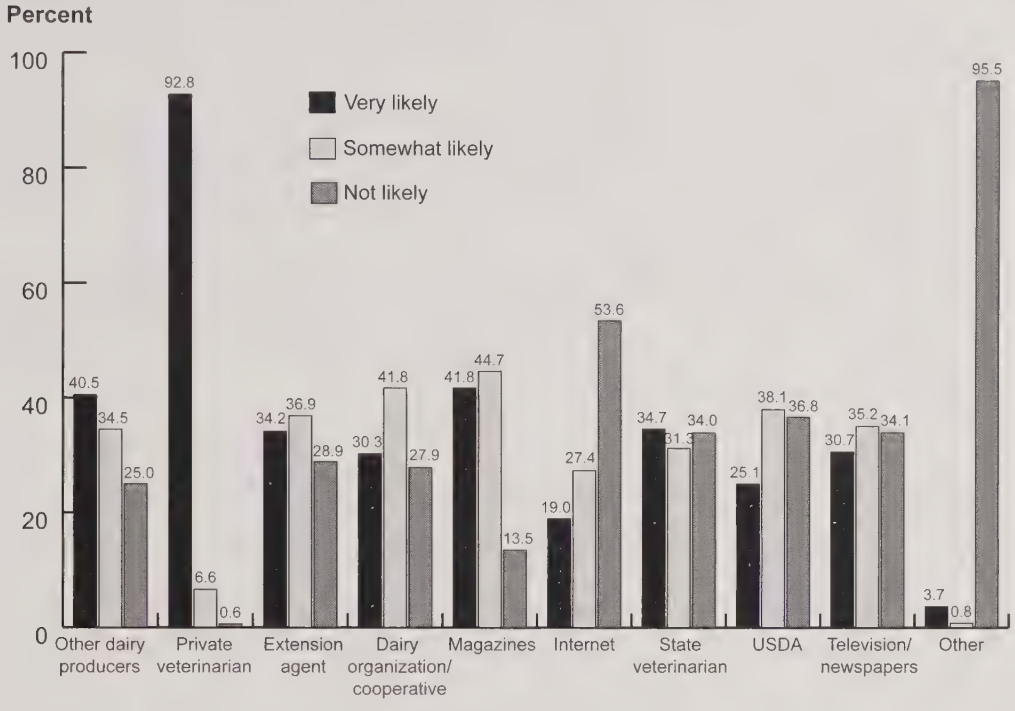
2. Information sources in case of a foreign animal disease outbreak

If a foreign animal disease outbreak occurred in the United States, 92.8 percent of operations would very likely contact their private veterinarian for information on the disease. Magazines, other dairy producers, State veterinarians and extension agents were the other information sources producers would very likely use.

a. Percentage of operations by likelihood of using the following information sources if an outbreak of foreign animal disease occurred in the United States (e.g., foot and mouth disease):

	Percent Operations						
	Very Likely		Somewhat Likely		Not Likely		
Information Source	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Total
Other dairy producers	40.5	(2.1)	34.5	(2.0)	25.0	(1.9)	100.0
Private veterinarian	92.8	(1.1)	6.6	(1.1)	0.6	(0.3)	100.0
Extension agent	34.2	(2.0)	36.9	(2.1)	28.9	(2.0)	100.0
Dairy organizations or cooperative	30.3	(1.9)	41.8	(2.1)	27.9	(1.9)	100.0
Magazines	41.8	(2.1)	44.7	(2.1)	13.5	(1.5)	100.0
Internet	19.0	(1.6)	27.4	(1.9)	53.6	(2.1)	100.0
State veterinarian	34.7	(2.1)	31.3	(2.0)	34.0	(2.1)	100.0
U.S. Department of Agriculture	25.1	(1.8)	38.1	(2.2)	36.8	(2.1)	100.0
Television/ newspapers	30.7	(2.1)	35.2	(2.0)	34.1	(2.0)	100.0
Other	3.7	(0.9)	0.8	(0.3)	95.5	(1.0)	100.0

Percent of Operations by Likelihood of Using the Following Information Sources if an Outbreak of Foreign Animal Disease Occurred



3. Resource contacts

In the event a foreign animal disease was suspected on their operation, 97.9 percent of producers would contact their private veterinarian, while 43.9 percent would contact the State veterinarian.

a. Percentage of operations that would contact the following resources if an animal on the operation was suspected of having foot and mouth disease or another foreign animal disease:

Resource Contact	Percent Operations	Standard Error
Extension agent/university	25.4	(1.8)
State veterinarian	43.9	(2.2)
U.S. Department of Agriculture	25.5	(1.8)
Private veterinarian	97.9	(0.7)
Feed company or milk cooperative representative	28.0	(1.9)
Other	3.3	(0.7)

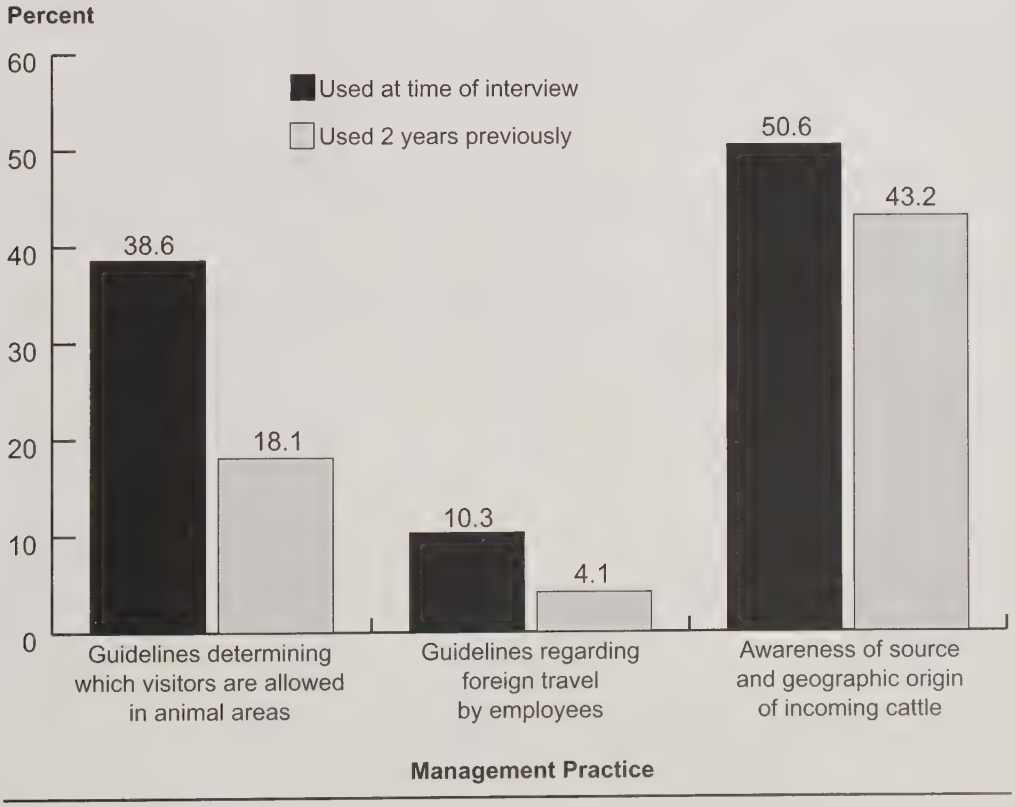
4. Guidelines: visitors, employee travel, cattle source

The percentage of operations that used guidelines determining which visitors were allowed in animal areas, as well as guidelines regarding foreign travel by employees and the awareness of the source and geographic origin of incoming cattle, was higher at the time of the interview than 2 years previously.

a. Percentage of operations that used the following management practices to prevent foreign animal disease, at the time of the interview and 2 years previously:

	Percent Operations			
	Used at Time of Interview		Used 2 Years Previously	
Management Practice	Percent	Standard Error	Percent	Standard Error
Guidelines determining which visitors are allowed in animal areas	38.6	(2.0)	18.1	(1.6)
Guidelines regarding foreign travel by employees	10.3	(1.2)	4.1	(0.9)
Awareness of source and geographic origin of incoming cattle	50.6	(2.2)	43.2	(2.1)

Percent of Operations Using the Following Practices to Prevent Foreign Animal Disease, at the Time of Interview and 2 Years Previously



The Southeast region had the lowest percentage of operations that had guidelines regarding foreign travel by employees at the time of the interview. The Southeast region also had a lower percentage of operations with guidelines regarding foreign travel by employees 2 years prior to the interview than the West and Midwest regions.

i. Percentage of operations that used the following management practices to prevent foreign animal disease, at the time of the interview and 2 years previously, by region:

		Percent Operations							
		Region							
		West		Midwest		Northeast		Southeast	
Management Practice	Time Period	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.
Guidelines determining which visitors are allowed in animal areas	At time of interview	47.7	(5.0)	35.2	(2.8)	45.7	(4.0)	27.7	(5.7)
	2 years previous	20.7	(3.6)	17.8	(2.2)	18.3	(3.2)	16.3	(4.8)
Guidelines regarding foreign travel by employees	At time of interview	17.7	(3.3)	10.4	(1.8)	9.5	(1.8)	2.3	(1.0)
	2 years previous	8.3	(2.7)	4.5	(1.4)	2.8	(1.1)	0.7	(0.4)
Awareness of source and geographic origin of incoming cattle	At time of interview	58.2	(4.8)	49.2	(3.0)	53.0	(4.1)	42.8	(8.6)
	2 years previous	55.6	(4.9)	40.6	(2.9)	46.1	(4.0)	37.8	(8.5)

Disease exclusion management practices regarding visitors, employee travel, and cattle source also were evaluated by herd size. The percentage of operations using these practices increased among small, medium, and large herds. The percentage of operations that were aware of the source and geographic origin of incoming cattle increased among small, medium, and large herds compared to 2 years prior to the interview.

ii. Percentage of operations that used the following management practices to prevent foreign animal disease, at the time of the interview and 2 years previously, by herd size:

		Percent Operations					
		Herd Size (Number of Dairy Cows)					
		Small (Less than 100)		**Medium** (100-499)		**Large** (500 or More)	
Management Practice	**Time Period**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Guidelines determining which visitors are allowed in animal areas	At time of interview	33.8	(2.6)	50.9	(3.1)	53.7	(4.2)
	2 years previous	16.3	(2.0)	23.0	(2.6)	20.9	(3.3)
Guidelines regarding foreign travel by employees	At time of interview	6.4	(1.5)	19.0	(2.3)	28.6	(3.8)
	2 years previous	3.5	(1.2)	5.4	(1.3)	7.8	(2.5)
Awareness of source and geographic origin of incoming cattle	At time of interview	46.4	(2.8)	61.3	(3.0)	64.6	(4.2)
	2 years previous	38.9	(2.7)	53.7	(3.1)	59.3	(4.2)

5. Written procedures preventing introduction and spread of disease
Only 5.1 percent of operations had written procedures specifically designed to prevent the introduction and spread of disease, other than those pertaining to milking.

a. Percentage of operations that had written procedures specifically related to preventing the introduction and spread of disease (other than milking procedures):

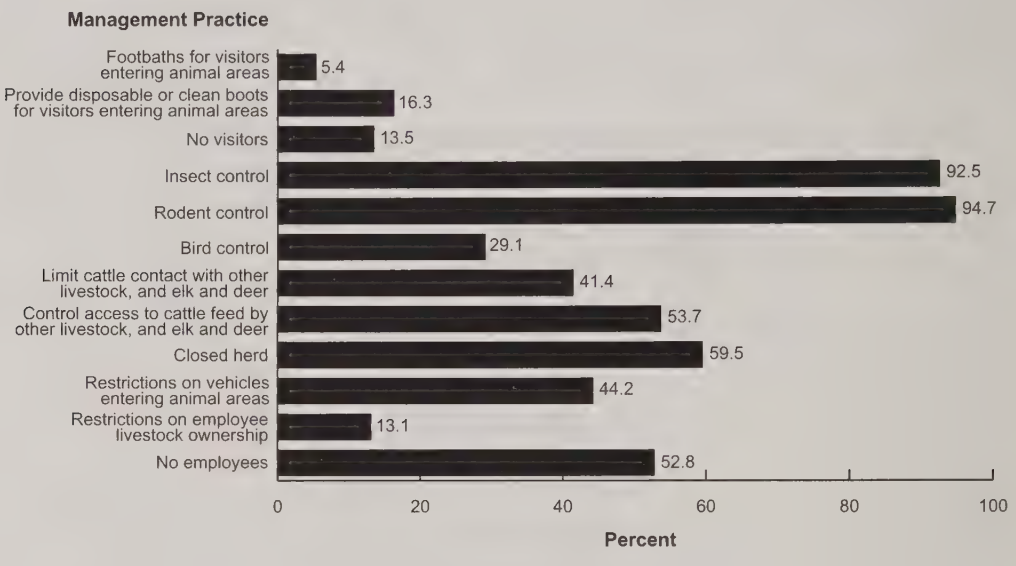
Percent Operations	Standard Error
5.1	(0.8)

6. Specific exclusion practices
To prevent the introduction and spread of pathogens, comprehensive disease exclusion practices should be designed. Overall, rodent control (94.7 percent of operations) and insect control (92.5 percent of operations) were the specific disease exclusion practices used by the highest percentage of operations in the year prior to the interview. Within this period, providing footbaths for visitors was the practice used by the lowest percentage of operations (5.4 percent). Small operations were least likely to use footbaths for visitors, provide disposable or clean boots for visitors, practice bird control, limit cattle contact with other livestock and elk and deer, or have restrictions on employee livestock ownership, as compared to medium and large operations. However, there was not a clear correlation between herd size and all management practices, which can most likely be attributed to financial and practical reasons.

a. Percentage of operations that used the following management practices to prevent disease during the 12 months prior to the interview, by herd size:

	Percent Operations							
	Herd Size (Number of Dairy Cows)							
	Small (Less than 100)		Medium (100-499)		Large (500 or More)		All Operations	
Management Practice	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Footbaths for visitors entering animal areas	3.9	(1.0)	9.3	(1.7)	11.3	(1.9)	5.4	(0.8)
Provide disposable or clean boots for visitors entering animal areas	11.2	(1.7)	29.0	(2.8)	35.2	(3.9)	16.3	(1.4)
No visitors	15.4	(2.0)	8.3	(1.5)	10.8	(2.8)	13.5	(1.5)
Insect control	93.8	(1.3)	88.7	(2.1)	92.8	(2.0)	92.5	(1.1)
Rodent control	96.0	(1.1)	91.7	(1.9)	88.6	(2.7)	94.7	(0.9)
Bird control	25.2	(2.4)	38.8	(3.0)	42.1	(4.0)	29.1	(1.9)
Limit cattle contact with other livestock, and elk and deer	36.4	(2.7)	53.7	(3.0)	58.9	(4.1)	41.4	(2.1)
Control access to cattle feed by other livestock, and elk and deer	52.1	(2.7)	58.7	(2.9)	52.0	(4.2)	53.7	(2.1)
Closed herd	64.5	(2.7)	47.6	(3.1)	38.4	(4.2)	59.5	(2.1)
Restrictions on vehicles entering animal areas	43.1	(2.7)	48.4	(3.1)	40.3	(4.2)	44.2	(2.1)
Restrictions on employee livestock ownership	6.3	(1.2)	29.1	(2.7)	39.3	(4.0)	13.1	(1.1)
No employees	67.8	(2.5)	15.8	(2.4)	1.0	(0.6)	52.8	(2.0)

Percent of Operations that Used the Following Practices to Prevent Disease During the 12 Months Prior to the Interview



7. Employee training

More than 40 percent of all operations trained employees in procedures designed to prevent the introduction and spread of disease. Employees on roughly half of medium and large operations and more than a third of small operations received specific training on these procedures.

a. For operations with employees, percentage of operations that trained employees in procedures designed to prevent the introduction and spread of disease, by herd size:

Percent Operations

Herd Size (Number of Dairy Cows)							
Small (Less than 100)		**Medium** (100-499)		**Large** (500 or More)		**All Operations**	
Percent	**Std. Error**	**Percent**	**Std. Error**	**Percent**	**Std. Error**	**Percent**	**Std. Error**
35.0	(4.5)	48.5	(3.3)	50.9	(4.2)	42.1	(2.7)

8. Equipment handling for manure and feeding

Using the same equipment for manure removal and feeding increases the risk of transmitting fecal-borne pathogens. Nevertheless, 58.8 percent of all operations used the same equipment to handle manure and feed cattle. Of these operations, 54.2 percent washed the equipment with only water or steam after handling manure, while 5.7 percent washed and chemically disinfected the equipment after handling manure. No cleaning procedures were performed after handling manure on 15.2 percent of operations that used the same equipment for manure and feeding cattle. Inadequate cleaning and/or disinfection of equipment used to handle manure and feed cattle can contaminate feed.

a. Percentage of operations that ever used the same equipment to handle manure and feed cattle:

Percent Operations	Standard Error
58.8	(2.1)

i. For operations that used the same equipment to handle manure and feed cattle, percentage of operations by procedure that best describes what is usually done with equipment after handling manure:

Procedure	Percent Operations	Standard Error
Washed equipment with water or steam only	54.2	(2.9)
Chemically disinfected only	0.0	(--)
Washed equipment and chemically disinfected	5.7	(1.5)
Other	24.9	(2.5)
No procedures	15.2	(2.2)
Total	100.0	

9. Equipment sharing with other livestock operations

Other livestock operations also can be a source of disease introduction. During the 12 months prior to the interview, 38.0 percent of operations shared heavy equipment (tractors, feeding equipment, manure spreaders, trailers, etc.) with other livestock operations.

a. Percentage of operations that shared any heavy equipment (tractors, feeding equipment, manure spreaders, trailers, etc.) with other livestock operations during the 12 months prior to the interview:

Percent Operations	Standard Error
38.0	(2.1)

B. General Management

Note: Total cow inventory may be used as a proxy for both lactating- and dry-cow numbers because most cows lactated and had a dry period at some point during the year.

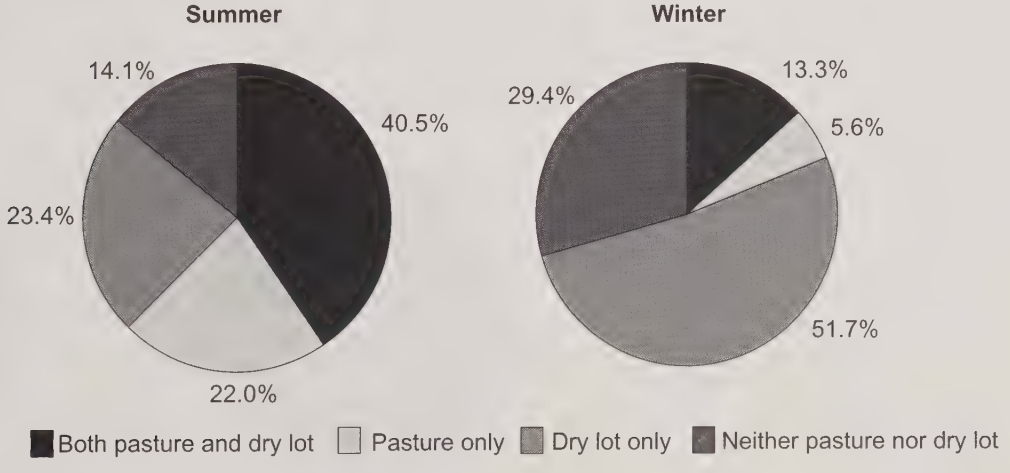
1. Outside access areas

The highest percentage of operations (40.5 percent) reported that lactating cows routinely had access to both pasture and dry lot in the summer (table a), which accounted for 24.0 percent of cows (table b). However, the highest percentage of cows (41.9 percent) had access to only dry lot in the summer while lactating (table b). The highest percentage of operations (51.7 percent) reported that lactating cows had access to dry lot only in the winter, which accounted for the highest percentage (53.8 percent) of cows (table b). Tables a and b for lactating cows show approximately the same relationship as tables c and d for dry cows. However, it is notable that roughly half as many cows are kept on pasture only when lactating compared to when dry.

a. Percentage of operations by best description of the outside area that ***lactating cows*** had access to routinely during summer and winter:

	Percent Operations			
	Summer		Winter	
Outside Area	**Percent**	**Standard Error**	**Percent**	**Standard Error**
Both pasture and dry lot	40.5	(2.2)	13.3	(1.4)
Pasture only	22.0	(1.9)	5.6	(0.9)
Dry lot only	23.4	(1.6)	51.7	(2.1)
Neither pasture nor dry lot	14.1	(1.3)	29.4	(1.8)
Total	100.0		100.0	

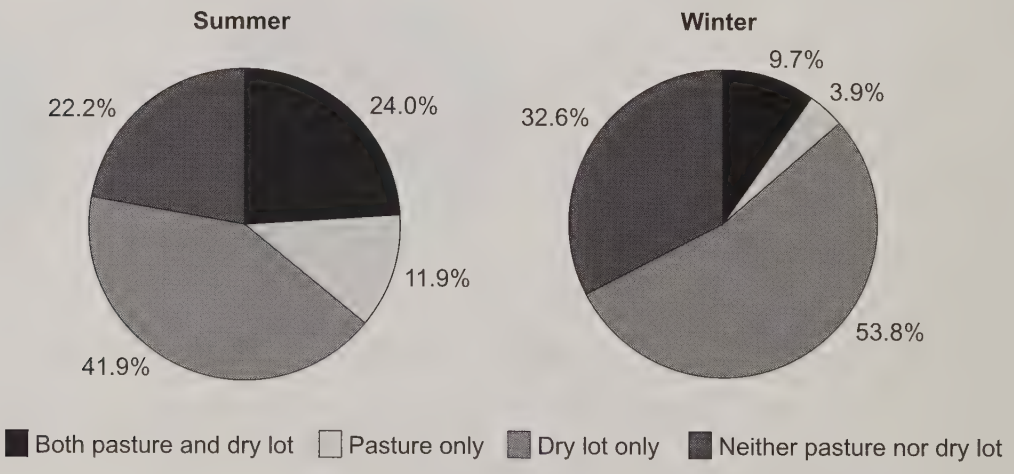
Percent of Operations by Best Description of Outside Area that Lactating Cows had Access to Routinely During Summer and Winter



b. Percentage of total cow inventory at time of interview by best description of the outside area that ***lactating cows*** had access to routinely during summer and winter:

	Percent Cows			
	Summer		Winter	
Outside Area	Percent	Standard Error	Percent	Standard Error
Both pasture and dry lot	24.0	(1.4)	9.7	(0.9)
Pasture only	11.9	(1.0)	3.9	(0.6)
Dry lot only	41.9	(1.6)	53.8	(1.7)
Neither pasture nor dry lot	22.2	(1.3)	32.6	(1.5)
Total	100.0		100.0	

Percent of Total Cow Inventory at Time of Interview by Best Description of the Outside Area that Lactating Cows had Access to Routinely During Summer and Winter

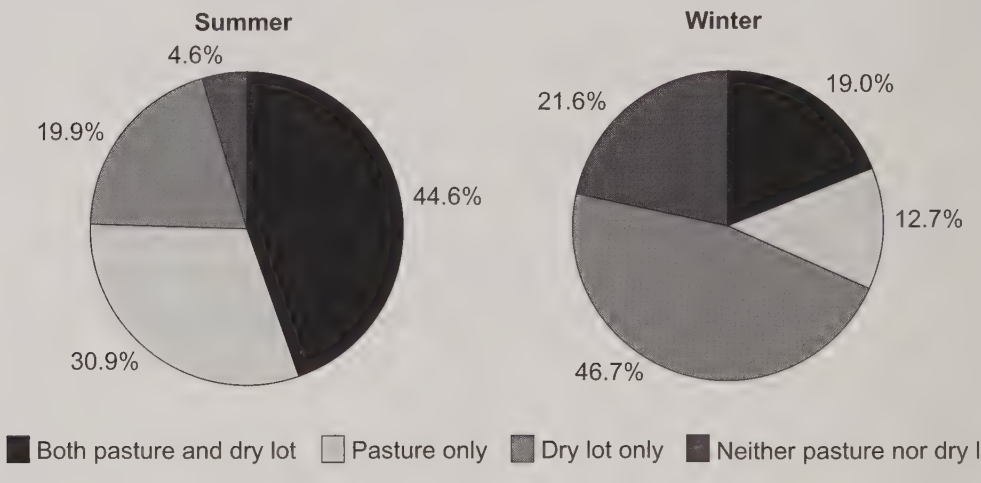


The table below might suggest that producers using both pasture and dry lot for their dry cows in summer (44.6 percent of operations) switched to dry lot only in winter (46.7 percent of operations) when forage was not available. In summer, about a third of producers (30.9 percent) used pasture only for dry cows and about half of these (12.7 percent) continued with pasture in winter. In summer, a third of the cows that were dry (33.2 percent, table d) were on both pasture and dry lot and another third (37.7 percent) were on dry lot only. In winter, half of the cows that were dry (50.4 percent) were on dry lot only.

c. Percentage of operations by best description of the outside area that ***dry cows*** had access to routinely during summer and winter:

	Percent Operations			
	Summer		Winter	
Outside Area	**Percent**	**Standard Error**	**Percent**	**Standard Error**
Both pasture and dry lot	44.6	(2.1)	19.0	(1.7)
Pasture only	30.9	(1.9)	12.7	(1.2)
Dry lot only	19.9	(1.6)	46.7	(2.1)
Neither pasture nor dry lot	4.6	(0.7)	21.6	(1.6)
Total	100.0		100.0	

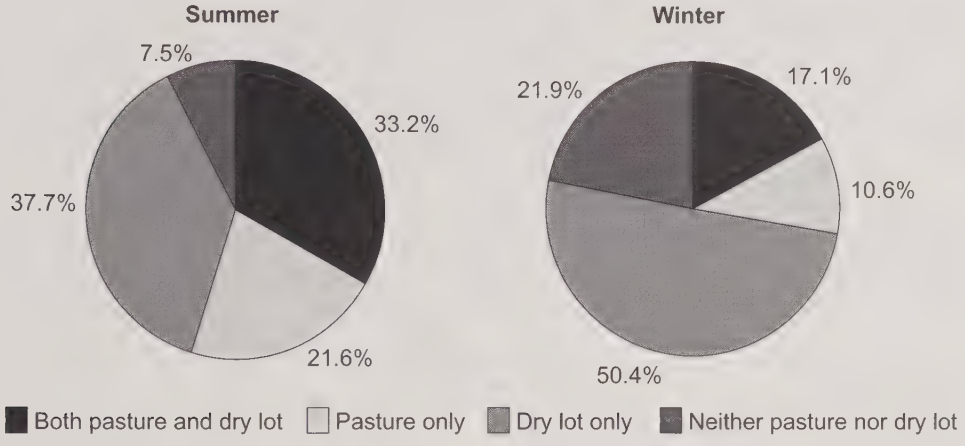
Percent of Operations by Best Description of Outside Area that Dry Cows had Access to Routinely During Summer and Winter



d. Percentage of total cow inventory at time of interview by best description of the outside area that ***dry cows*** had access to routinely during summer and winter:

	Percent Cows			
	Summer		Winter	
Outside Area	Percent	Standard Error	Percent	Standard Error
Both pasture and dry lot	33.2	(1.7)	17.1	(1.4)
Pasture only	21.6	(1.2)	10.6	(0.9)
Dry lot only	37.7	(1.8)	50.4	(1.8)
Neither pasture nor dry lot	7.5	(1.0)	21.9	(1.4)
Total	100.0		100.0	

Percent of Total Cow Inventory at Time of Interview by Best Description of Outside Area that Dry Cows had Access to Routinely During Summer and Winter



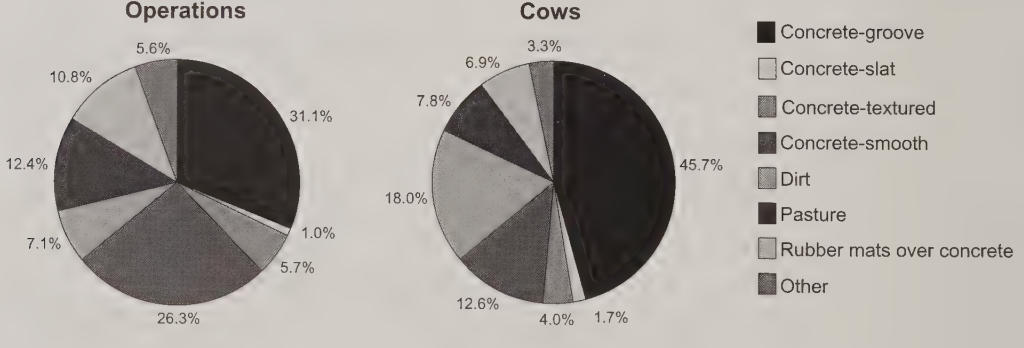
2. Flooring type

Nearly one out of three operations (31.1 percent) used grooved concrete as the predominant flooring type that lactating cows stood or walked on when not being milked, and these operations had 45.7 percent of the cows. Data from the Dairy '96 study indicated that cows that predominantly stood on grooved concrete were 2.7 times more likely to have more than a 5 percent incidence of digital dermatitis (hairy-heel warts) than cows that predominantly stood on textured concrete. Slightly over one out of four operations (26.3 percent) used smooth concrete, but these operations only had 12.6 percent of the cows. Pasture, and rubber mats over concrete were the predominant flooring types on 12.4 and 10.8 percent of operations, respectively.

a. Percentage of operations (and percentage of cows on these operations) by predominant flooring type that lactating cows stood or walked on when not being milked:

Flooring Type	Percent Operations	Standard Error	Percent Cows	Standard Error
Concrete – groove	31.1	(1.7)	45.7	(1.9)
Concrete – slat	1.0	(0.3)	1.7	(0.5)
Concrete – textured	5.7	(1.0)	4.0	(0.7)
Concrete – smooth	26.3	(2.0)	12.6	(1.0)
Dirt	7.1	(1.0)	18.0	(1.8)
Pasture	12.4	(1.3)	7.8	(0.8)
Rubber mats over concrete	10.8	(1.4)	6.9	(1.0)
Other	5.6	(1.0)	3.3	(0.7)
Total	100.0		100.0	

Percent of Operations (and Percent of Cows on These Operations) by Predominant Flooring Type that Lactating Cows Stood or Walked on When Not Being Milked



3. Surface moisture

Most operations reported that cows predominantly stood on ground or flooring that was usually dry in summer (63.3 percent) and winter (49.7 percent). Fewer operations reported that cows stood in areas that were almost always wet but had no standing water in summer (13.3 percent) or in winter (23.1 percent). Very few operations reported that cows stood in areas with standing water or slurry (1.2 percent for both summer and winter).

a. Percentage of operations by category that best characterizes the surface moisture of the ground or flooring that lactating cows stood on most of the time in summer and winter:

	Percent Operations			
	Summer		Winter	
Surface Moisture	Percent	Standard Error	Percent	Standard Error
Usually dry	63.3	(2.0)	49.7	(2.1)
Wet about half the time	22.2	(1.8)	26.0	(1.8)
Almost always wet, but no standing water	13.3	(1.2)	23.1	(1.5)
Usually standing water or slurry	1.2	(0.5)	1.2	(0.4)
Total	100.0		100.0	

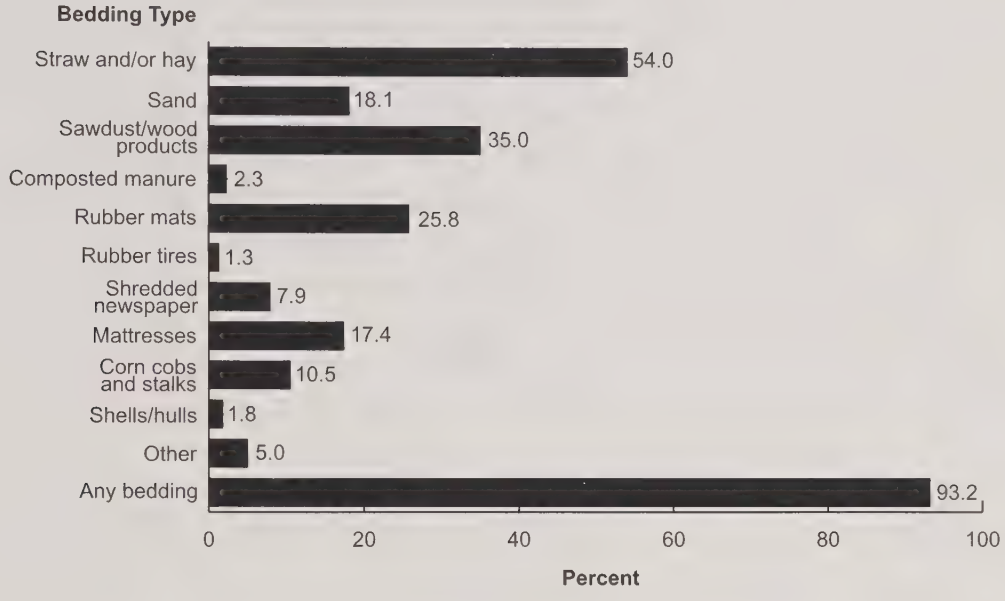
4. Bedding types for lactating cows

About half of operations (54.0 percent) used straw and/or hay as bedding for lactating cows in the 90 days prior to the interview; 35.0 percent used sawdust or other wood products; and 25.8 percent used rubber mats. Other bedding types included sand, mattresses, and corn cobs and stalks, 18.1, 17.4, and 10.5 percent of operations, respectively. Most lactating cows were bedded on straw and/or hay (35.6 percent) and on sawdust or other wood products (32.1 percent). Although only 2.3 percent of operations used composted manure as bedding in the 90 days prior to the interview, 12.7 percent of lactating cows bedded on composted manure.

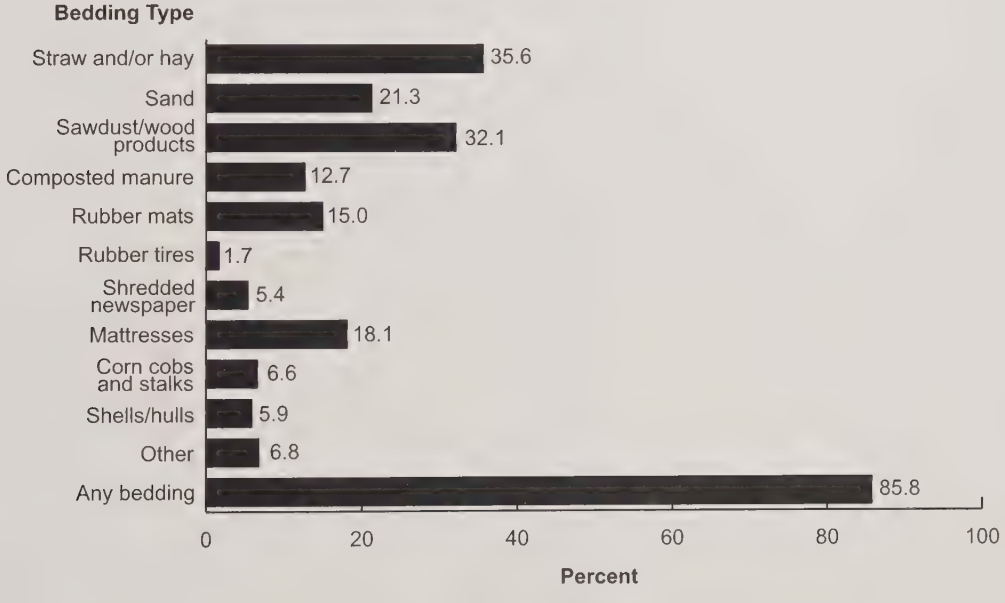
a. Percentage of operations (and percentage of cows on these operations) by type of bedding used for lactating cows in the 90 days prior to the interview:

Bedding Type	Percent Operations	Standard Error	Percent Cows	Standard Error
Straw and/or hay	54.0	(2.0)	35.6	(1.5)
Sand	18.1	(1.5)	21.3	(1.6)
Sawdust/wood products	35.0	(1.9)	32.1	(1.5)
Composted manure	2.3	(0.4)	12.7	(1.5)
Rubber mats	25.8	(2.0)	15.0	(1.2)
Rubber tires	1.3	(0.4)	1.7	(0.4)
Shredded newspaper	7.9	(1.2)	5.4	(0.7)
Mattresses	17.4	(1.5)	18.1	(1.2)
Corn cobs and stalks	10.5	(1.4)	6.6	(0.8)
Shells/hulls	1.8	(0.4)	5.9	(1.1)
Other	5.0	(1.0)	6.8	(1.1)
Any bedding	93.2	(0.8)	85.8	(1.6)

Percent of *Operations* by Type of Bedding Used for Lactating Cows in the 90 Days Prior to the Interview



Percent of *Cows* by Type of Bedding Used for Lactating Cows in the 90 Days Prior to the Interview



5. Feedstuff for lactating cows

More than 9 out of 10 operations fed corn and/or alfalfa hay/haylage to lactating cows during the 90 days prior to the interview (95.8 and 93.8 percent, respectively). Eight out of 10 operations fed whole soybeans or soybean meal and/or corn silage (83.6 percent and 81.6 percent, respectively). Feather/poultry meal was fed on the lowest percentage of operations (3.0 percent). Clover, as forage or pasture, and green chop were included as feedstuffs on 22.5 percent and 3.9 percent of operations, respectively. However, the timing of the study, with data collected between February 25 and May 30, may have underestimated the overall use of these two feed ingredients.

a. Percentage of operations by type of feedstuff fed to lactating cows during the 90 days prior to the interview:

Feedstuff	Percent Operations	Standard Error
Alfalfa hay/haylage	93.8	(1.0)
Corn silage	81.6	(1.7)
Clover as forage or pasture	22.5	(1.9)
Whole cottonseed or hulls	37.8	(2.0)
Cotton seed meal	7.9	(1.0)
Whole soybeans or soybean meal	83.6	(1.5)
Bakery byproducts	5.5	(0.8)
Brewery byproducts	30.6	(1.9)
Corn	95.8	(0.7)
Barley	12.8	(1.2)
Wheat	6.7	(1.0)
Oats	22.3	(2.0)
Green chop	3.9	(1.0)
Feather/poultry meal	3.0	(0.7)
Fishmeal	4.9	(0.7)
Tallow	20.0	(1.6)

6. Bulk tank somatic cell count

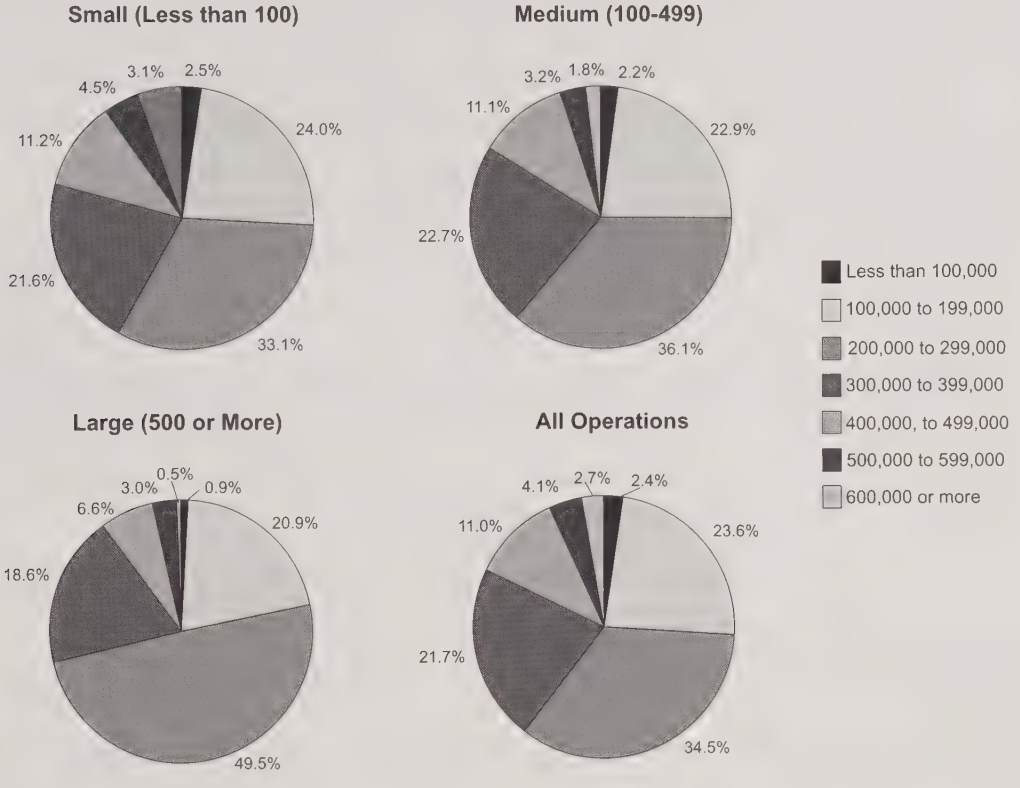
Bulk tank somatic cell count (BTSCC) is a reflection of overall udder health. BTSCCs also have a direct effect on milk production. Dairy '96 showed (using herds with less than 200,000 BTSCCs as a baseline) that herds with BTSCCs of 200,000 to 399,000 had an 819-pound reduction in milk production, as compared to herds with a BTSCC higher than 400,000, which had a 2,114-pound reduction in milk production. For Grade A milk in the United States, the regulatory standard somatic cell count is 750,000. Recently, there have been controversial proposals within the dairy industry to lower the regulatory standard to 400,000 somatic cells, which is the current European standard. Dairy 2002 producers were asked to identify the category of BTSCCs that best described the average BTSCC for milk shipped during the 90 days prior to the interview. More than one in three operations (34.5 percent) had an average BTSCC of 200,000 to 299,000, while 23.6 percent of operations had an average BTSCC of 100,000 to 199,000, and 21.7 percent of operations had an average BTSCC of 300,000 to 399,000. Only 2.4 percent of operations had an average BTSCC of less than 100,000, while 2.7 percent had an average BTSCC of 600,000 or more. Nearly 50 percent of large operations averaged BTSCCs between 200,000 and 299,000. Small herds had a higher percentage of operations with BTSCCs of 400,000 or more compared to large herds (18.8 and 10.1 percent, respectively).

a. Percentage of operations by category that best describes the operations' average bulk tank somatic cell count (BTSCC) for milk shipped during the 90 days prior to the interview, by herd size:

Percent Operations

	Herd Size (Number of Dairy Cows)							
	Small (Less than 100)		**Medium** (100-499)		**Large** (500 or More)		**All Operations**	
BTSCC	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Less than 100,000	2.5	(0.8)	2.2	(0.8)	0.9	(0.6)	2.4	(0.6)
100,000 to 199,000	24.0	(2.4)	22.9	(2.5)	20.9	(3.5)	23.6	(1.9)
200,000 to 299,000	33.1	(2.7)	36.1	(3.0)	49.5	(4.2)	34.5	(2.1)
300,000 to 399,000	21.6	(2.3)	22.7	(2.6)	18.6	(3.2)	21.7	(1.7)
400,000 to 499,000	11.2	(1.9)	11.1	(1.8)	6.6	(2.0)	11.0	(1.4)
500,000 to 599,000	4.5	(1.1)	3.2	(1.0)	3.0	(1.4)	4.1	(0.9)
600,000 or more	3.1	(0.9)	1.8	(0.9)	0.5	(0.5)	2.7	(0.7)
Total	100.0		100.0		100.0		100.0	

Percent of Operations by Category that Best Describes the Operations' Average Bulk Tank Somatic Cell Count for Milk Shipped During the 90 Days Prior to the Interview, by Herd Size



In the West, Midwest, and Northeast regions, the percentages of operations were similarly distributed across the BTSCC categories, with more than 8 out of 10 operations with BTSCCs less than 400,000. The Southeast region had only about one in two operations with BTSCCs less than 400,000.

b. Percentage of operations by category that best describes the operations' average bulk tank somatic cell count (BTSCC) for milk shipped during the 90 days prior to the interview, by region:

	Percent Operations							
	Region							
	West		Midwest		Northeast		Southeast	
BTSCC	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Less than 100,000	2.4	(1.4)	1.9	(0.9)	3.5	(1.4)	1.5	(1.5)
100,000 to 199,000	21.3	(3.3)	23.6	(2.6)	29.4	(3.9)	2.9	(2.1)
200,000 to 299,000	34.5	(4.0)	36.0	(2.9)	34.0	(3.9)	23.2	(7.9)
300,000 to 399,000	26.8	(4.7)	21.0	(2.5)	20.4	(2.9)	26.6	(5.5)
400,000 to 499,000	9.5	(2.9)	11.5	(1.9)	6.9	(2.6)	25.9	(8.1)
500,000 to 599,000	3.0	(1.4)	3.8	(1.2)	3.7	(1.7)	9.9	(4.0)
600,000 or greater	2.5	(1.5)	2.2	(0.9)	2.1	(1.1)	10.0	(4.6)
Total	100.0		100.0		100.0		100.0	

7. Cow drinking water

Contamination of cow water sources can lead to the introduction of disease-causing organisms such as *E. coli, Salmonella,* and *Cryptosporidium.* Tanks, troughs, and cups should be designed for minimal fecal contamination, maximal accessibility for frequent cleaning, and should be strategically located to prevent commingling of young and older animals. Overall, the majority of operations (89.1 percent) used a water tank or trough (either covered or uncovered) as a water source during the 12 months prior to the interview. The use of single-cup or bowl waterers for one or more cows decreased as herd size increased. Use of natural water sources (lake, pond, stream, river, etc.) decreased as herd size increased.

a. Percentage of operations by sources of drinking water for any cows during the 12 months prior to the interview, by herd size:

Percent Operations

Herd Size (Number of Dairy Cows)

	Small (Less than 100)		**Medium** (100-499)		**Large** (500 or More)		**All Operations**	
Water Source	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Single-cup/bowl waterer used by one cow only	11.6	(1.8)	8.9	(1.9)	6.3	(2.4)	10.7	(1.4)
Single-cup/bowl waterer used by multiple cows	72.3	(2.3)	37.9	(2.9)	13.2	(2.9)	61.7	(1.8)
Water tank or trough (covered or uncovered)	85.8	(2.0)	97.8	(0.7)	98.3	(1.6)	89.1	(1.4)
Lake, pond, stream, river, etc.	38.3	(2.6)	29.9	(2.7)	8.6	(1.7)	35.1	(2.0)
Other source	2.3	(0.9)	1.5	(0.8)	1.1	(0.5)	2.1	(0.7)

All operations in the West and Southeast regions used water tanks or troughs (either covered or uncovered). Single-cup or bowl waterers used by multiple cows were much more prevalent on operations in the Northeast and Midwest regions (73.6 and 68.8 percent, respectively) than in the other regions.

b. Percentage of operations by sources of drinking water for cows during the 12 months prior to the interview, by region:

	Percent Operations							
	Region							
	West		Midwest		Northeast		Southeast	
Water Source	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Single-cup/bowl waterer used by one cow only	4.6	(1.8)	10.3	(1.9)	13.0	(2.8)	13.3	(7.0)
Single-cup/bowl waterer used by multiple cows	8.9	(2.6)	68.8	(2.6)	73.6	(3.2)	22.7	(5.5)
Water tank or trough (covered or uncovered)	100. 0	(--)	87.0	(2.1)	87.5	(2.7)	100.0	(--)
Lake, pond, stream, river, etc.	17.2	(4.3)	25.2	(2.6)	53.7	(3.9)	69.9	(7.7)
Other source	4.9	(2.2)	1.7	(0.9)	1.0	(0.7)	6.3	(6.2)

Frequent and thorough removal of organic material from waterers can greatly reduce the pathogen load and decrease disease transmission. For operations that used a water tank or trough, the highest percentage (26.6 percent) drained and cleaned solids and scum more than 12 times per year. Nearly two-thirds of operations (61.3 percent) drained and cleaned water tanks or troughs more than four times per year.

c. For operations that used a water tank or trough, percentage of operations by number of times per year tank or trough was drained and solids and scum cleaned out:

Frequency (Times per Year)	Percent Operations	Standard Error
1	14.0	(1.7)
2	20.0	(2.0)
3	4.7	(0.9)
4 to 6	19.3	(2.0)
7 to 12	15.4	(1.7)
More than 12	26.6	(2.0)
Total	100.0	

Drinking water can be safely disinfected with a chemical treatment, commonly chlorine. The use of chlorine to disinfect cows' drinking water occurred on 9.8 percent of all operations. Chlorine use in drinking water increased between small and medium herd sizes (7.7 and 15.0 percent, respectively). The Southeast region had the highest percentage of operations (39.9 percent) that usually chlorinated cows' drinking water, while Midwest operations were the least likely to use chlorine as a drinking water disinfectant, only 5.2 percent of operations (table e).

d. Percentage of operations where cows' drinking water was usually chlorinated, by herd size:

Percent Operations							
Herd Size (Number of Dairy Cows)							
Small (Less than 100)		**Medium** (100-499)		**Large** (500 or More)		**All Operations**	
Pct.	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
7.7	(1.1)	15.0	(2.1)	15.5	(3.0)	9.8	(1.0)

e. Percentage of operations where cows' drinking water was usually chlorinated, by region:

Percent Operations							
Region							
West		**Midwest**		**Northeast**		**Southeast**	
Pct.	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
16.8	(3.8)	5.2	(1.0)	10.0	(1.9)	39.9	(5.7)

8. Lameness in cows and bred heifers

The percentage of lameness cases was similar across all herd sizes, with 20.4 percent of cows and 8.1 percent of bred heifers (as a percentage of cow and bred heifer inventory) having a case of lameness during the 12 months prior to the interview. The percentage of lameness cases in cows shows an increasing trend since the Dairy '96 study (in which 7.2 percent of cows experienced clinical signs of lameness) or it may be that producers are more aware of the problem and are keeping better records of lameness events.

a. Cases of lameness in cows and bred heifers during the 12 months prior to the interview (as a percentage of cow and bred heifer inventory at time of interview), by herd size:

Percent Cows/Heifers

Herd Size (Number of Dairy Cows)

	Small (Less than 100)		**Medium** (100-499)		**Large** (500 or More)		**All Operations**	
Animal Type	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Cows	20.8	(1.2)	22.5	(1.5)	17.9	(2.1)	20.4	(1.0)
Bred heifers	5.9	(0.7)	9.5	(1.1)	9.2	(1.6)	8.1	(0.7)

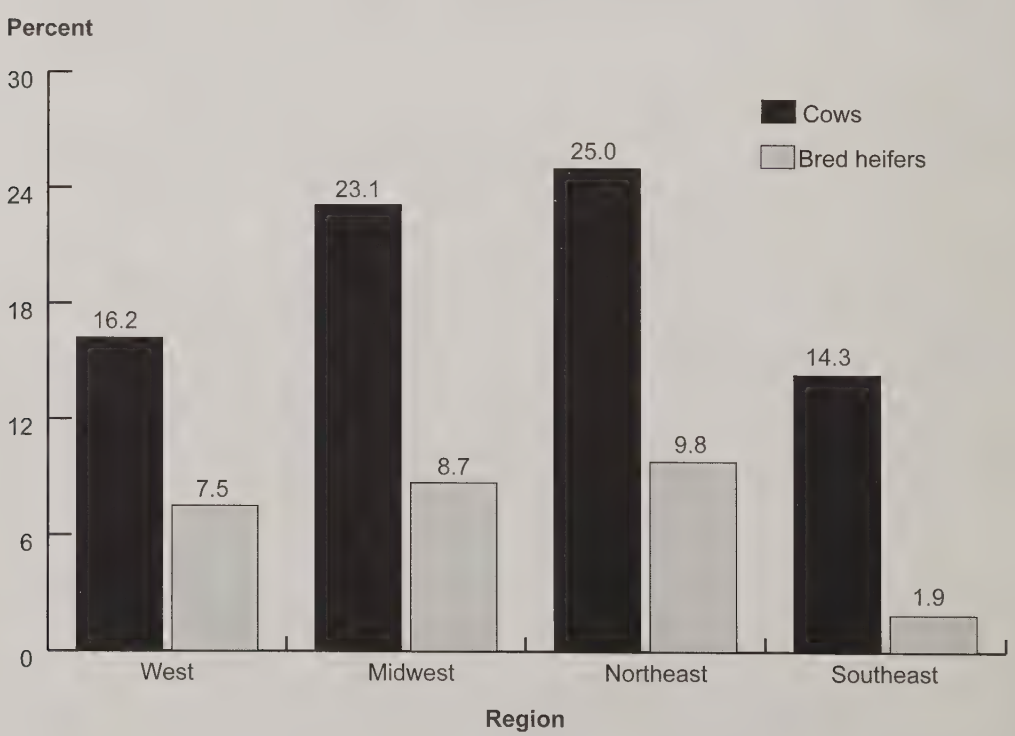
The Southeast and West region had the lowest percentage of lameness cases in cows (14.3 and 16.2 percent, respectively). The Southeast region had the lowest percentage for bred heifers. The Southeast region also reported the lowest percentage of cow and heifer lameness in the Dairy '96 study.

b. Cases of lameness in cows and bred heifers during the 12 months prior to the interview (as a percentage of cow and bred heifer inventory at time of interview), by region:

Percent Cows/Heifers

	Region							
	West		Midwest		Northeast		Southeast	
Animal Type	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Cows	16.2	(1.6)	23.1	(1.8)	25.0	(1.7)	14.3	(1.7)
Bred Heifers	7.5	(1.3)	8.7	(1.1)	9.8	(1.0)	1.9	(0.4)

Cases of Lameness in Cows and Bred Heifers During the 12 months Prior to the Interview (as a Percentage of Cow and Bred Heifer Inventory at Time of Interview), by Region



Over half of all lameness cases on U.S. dairy operations were attributed to digital dermatitis (hairy-heel warts). Producers reported that 53.9 percent of lameness cases in cows and 61.8 percent of lameness cases in bred heifers were due to digital dermatitis. Since the late 1980s, digital dermatitis has been identified as an important cause of lameness in the United States. No differences in the percentage of lameness in cows caused by digital dermatitis were seen among herd sizes. In bred heifers, small herds had a lower percentage of lameness due to digital dermatitis than medium or large herds.

c. Of the cases of lameness in cows and bred heifers during the 12 months prior to the interview, percentage of cases due to digital dermatitis (hairy-heel warts), by herd size:

Percent Cases

	Herd Size (Number of Dairy Cows)							
	Small (Less than 100)		**Medium** (100-499)		**Large** (500 or More)		**All Operations**	
Animal Type	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Cows	53.5	(2.7)	58.3	(2.5)	48.7	(5.0)	53.9	(2.0)
Bred heifers	43.0	(4.8)	68.0	(3.5)	69.0	(5.2)	61.8	(2.8)

No regional differences in the percentage of lameness cases caused by digital dermatitis in cows were reported.

d. Of the cases of lameness in cows and bred heifers during the 12 months prior to the interview, percentage of cases due to digital dermatitis (hairy-heel warts), by region:

	Percent Cases							
	Region							
	West		Midwest		Northeast		Southeast	
Animal Type	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Cows	46.8	(4.2)	57.7	(2.8)	56.1	(3.1)	49.4	(6.5)
Bred heifers	59.8	(6.5)	62.1	(3.9)	65.5	(4.0)	30.2	(9.6)

9. Feeding practices

Formulating rations for different stages of lactation has been proposed in order to maintain proper body condition and also decrease feed costs. The majority of operations (59.1 percent) fed all lactating cows the same ration, while 38.2 percent of operations fed groups based on production. Most large herds (54.3 percent) fed based on production, while most medium and small herds fed lactating cows mainly the same ration (61.4 and 59.8 percent, respectively).

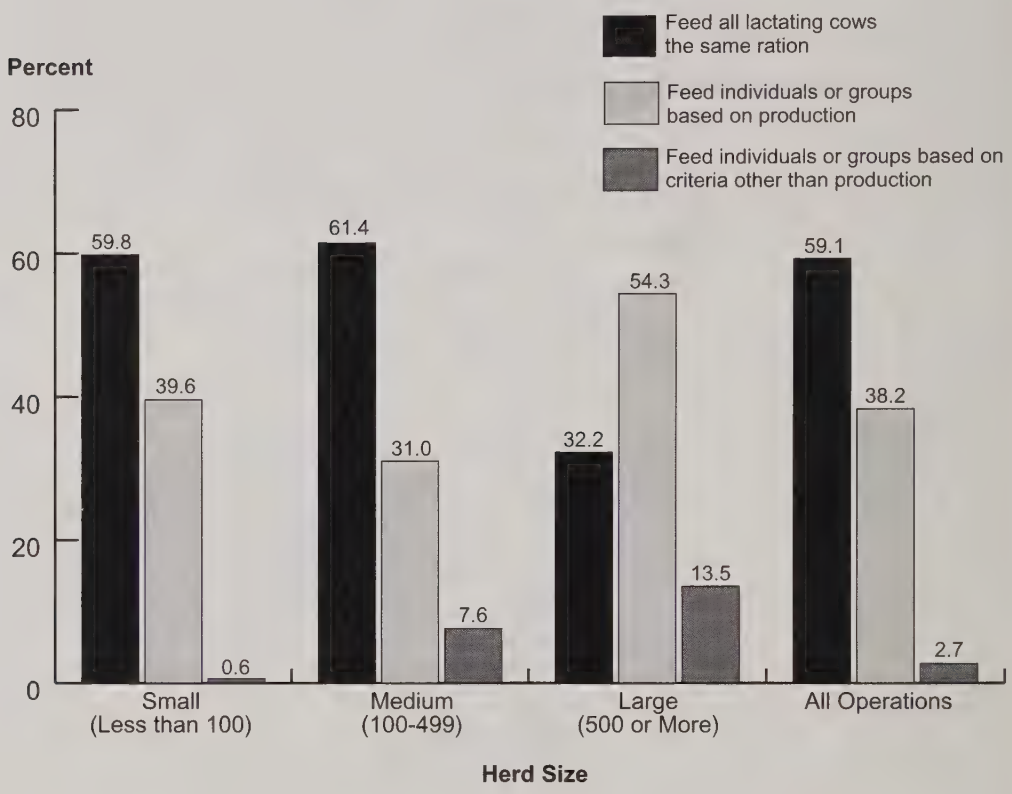
a. Percentage of operations by feeding practices for lactating cows and by herd size:

Percent Operations

Herd Size (Number of Dairy Cows)

	Small (Less than 100)		**Medium** (100-499)		**Large** (500 or More)		**All Operations**	
Feeding Practice	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Feed all lactating cows the same ration	59.8	(2.8)	61.4	(3.0)	32.2	(4.0)	59.1	(2.2)
Feed individuals or groups based on production	39.6	(2.8)	31.0	(2.9)	54.3	(4.1)	38.2	(2.2)
Feed individuals or groups based on criteria other than production	0.6	(0.3)	7.6	(1.6)	13.5	(2.5)	2.7	(0.4)
Total	100.0		100.0		100.0		100.0	

Percent of Operations by Feeding Practices for Lactating Cows and by Herd Size



In the Midwest and Southeast regions, the majority of operations fed all lactating cows the same ration.

b. Percentage of operations by feeding practices for lactating cows and by region:

	Percent Operations							
	Region							
	West		Midwest		Northeast		Southeast	
Feeding Practice	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Feed all lactating cows the same ration	50.4	(4.9)	61.8	(2.9)	52.3	(4.2)	74.7	(8.2)
Feed individuals or groups based on production	42.1	(4.8)	35.9	(2.9)	45.0	(4.2)	25.3	(8.2)
Feed individuals or groups based on criteria other than production	7.5	(1.8)	2.3	(0.6)	2.7	(0.8)	0.0	(--)
Total	100.0		100.0		100.0		100.0	

Anionic salts have been used to decrease the incidence of periparturient diseases, primarily hypocalcemia. Since heifers are at a very low risk of hypocalcemia, and because anionic salts are relatively expensive, feeding anionic salts to heifers is not recommended. Palatability of anionic salts, which has been a problem, has improved with recent formulation refinements. The most common anionic salts included in diets are calcium chloride, magnesium chloride, and ammonium chloride. Monitoring the urine pH of cows receiving anionic salts is recommended to make sure that anionic salt intake is at the correct level. Overall, 19.1 percent of operations, representing 36.7 percent of cows and heifers (table e) fed anionic salts to cows close to calving, while 14.3 percent fed anionic salts to springing heifers. Anionic salt feeding increased with herd size for both cows and heifers. The majority of large operations (63.8 percent) fed anionic salts to cows and 52.2 percent fed anionic salts to heifers prior to calving.

c. Percentage of operations that fed anionic salts to cows close to calving and to springing heifers, by herd size:

Percent Operations

	Herd Size (Number of Dairy Cows)							
	Small (Less than 100)		**Medium** (100-499)		**Large** (500 or More)		**All Operations**	
Animal Type	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Cows close to calving	13.9	(1.7)	27.0	(2.6)	63.8	(4.0)	19.1	(1.4)
Springing heifers	9.3	(1.4)	22.9	(2.5)	52.2	(4.3)	14.3	(1.2)

The West and Southeast regions had the highest percentage (37.3 and 33.0 percent, respectively) of operations that fed anionic salts to cows close to calving. The West and Southeast also had the highest percentage (30.1 and 34.0 percent, respectively) of operations that fed anionic salts to springing heifers.

d. Percentage of operations that fed anionic salts to cows close to calving and to springing heifers, by region:

	Percent Operations							
	Region							
	West		Midwest		Northeast		Southeast	
Animal Type	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Cows close to calving	37.3	(3.9)	15.6	(1.9)	17.2	(3.0)	33.0	(5.1)
Springing heifers	30.1	(3.6)	11.1	(1.6)	11.1	(2.3)	34.0	(5.2)

e. Percentage of total cow inventory (January 1, 2002) on operations that fed ***any*** anionic salts to either cows close to calving or to springing heifers:

Percent Cows	Standard Error
36.7	(1.9)

Nearly two out of three operations (63.9 percent) separated cows close to calving from other dry cows. Separating close-up cows allows feeding a transition ration that might include anionic salts and can facilitate closer observation of cows at the time of calving.

f. Percentage of operations that separated cows close to calving (close-up cows/springers) from other dry cows:

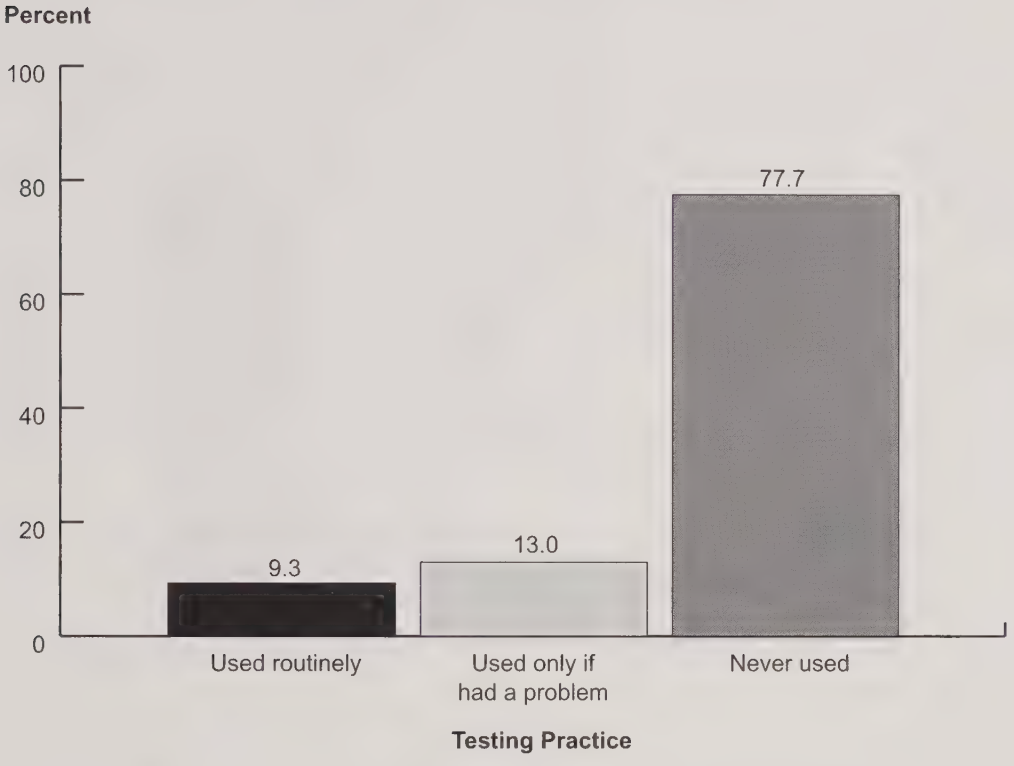
Percent Operations	Standard Error
63.9	(2.1)

Milk urea nitrogen (MUN) has been used to determine if ration ingredients are properly formulated and utilized by cows. Protein and energy are the two main ration components evaluated using MUN testing. Most operations (77.7 percent) had never used MUN testing, while 9.3 percent routinely used MUN testing for ration refinement. Thirteen percent of operations used MUN testing only if they experienced a problem.

g. Percentage of operations by practice that best describes the use of milk urea nitrogen (MUN) testing to determine ration composition:

Testing Practice	Percent Operations	Standard Error
Used routinely	9.3	(1.0)
Used only if had a problem	13.0	(1.3)
Never used	77.7	(1.6)
Total	100.0	

Percent of Operations by Practice that Best Describes the Use of Milk Urea Nitrogen (MUN) Testing to Determine Ration Composition



10. Tail docking

Tail docking remains quite controversial in the United States. Proponents claim the practice aids in cow cleanliness, udder health, and milk quality, while opponents raise issues of impaired fly control and animal welfare. A recent study reported by Schreiner DA, Ruegg PL[1] showed no significant behavioral or physiologic response to tail docking in preparturient heifers or calves. In a separate study, Schreiner DA, Ruegg PL[2] demonstrated that there was no significant effect on milk quality or udder or leg cleanliness between cows with docked tails and cows whose tails were not docked. At the time of the interview, nearly half of all operations (49.5 percent) reported that none of their dairy cows (0.0 percent) had docked tails. On 15.9 percent of operations, the entire cow inventory (100.0 percent of cows) had docked tails. The highest percentages of operations with all (100 percent) of their cow inventory tail-docked were found on medium-sized operations (23.9 percent).

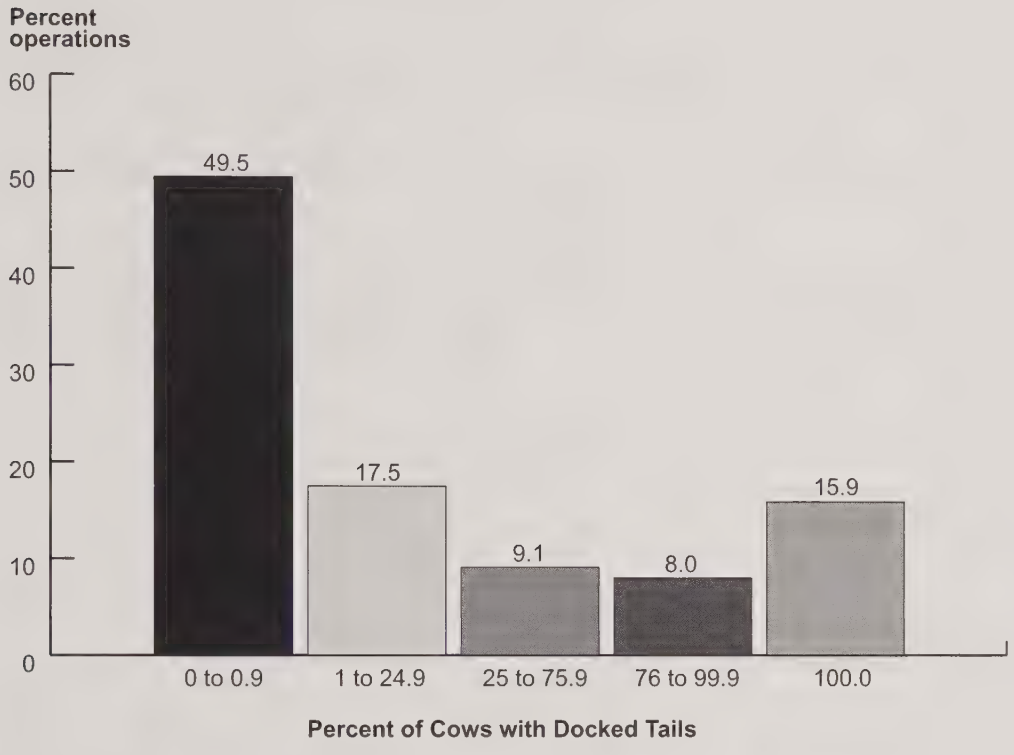
a. Percentage of operations by percentage of cows with docked tails (as a percentage of cow inventory at time of interview), by herd size:

Percent Operations

	Herd Size (Number of Dairy Cows)							
	Small (Less than 100)		**Medium** (100-499)		**Large** (500 or More)		**All Operations**	
Percent of Cows With Docked Tails	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
0	52.8	(2.8)	38.3	(2.8)	53.6	(3.6)	49.5	(2.1)
1.0 to 24.9	18.3	(2.1)	15.8	(2.2)	13.3	(2.8)	17.5	(1.6)
25.0 to 75.9	8.8	(1.6)	10.0	(1.9)	8.9	(2.6)	9.1	(1.3)
76.0 to 99.9	6.5	(1.4)	12.0	(1.9)	11.5	(2.0)	8.0	(1.1)
100.0	13.6	(1.9)	23.9	(2.6)	12.7	(2.0)	15.9	(1.5)
Total	100.0		100.0		100.0		100.0	

[1] Responses to tail docking in calves and heifers.
J Dairy Sci. 2002 Dec;85(12):3287-96
[2] Effects of tail docking on milk quality and cow cleanliness.
J Dairy Sci. 2002 Oct;85(10):2503-11

Percent of Operations by Percent of Cows with Docked Tails (as a Percent of Cow Inventory at Time of Interview)



At the time of the interview, the West region had a larger percentage of operations (68.6 percent) with none of the cow inventory tail-docked compared to the Midwest and Northeast regions. The West and Southeast regions had the lowest percentage of operations (3.9 and 5.3 percent, respectively) where the entire cow inventory was tail-docked. In the Midwest and Northeast regions the distribution across the five docking categories was similar.

b. Percentage of operations by percentage of cows with docked tails (as a percentage of cow inventory at time of interview), by region:

	Percent Operations							
	Region							
	West		Midwest		Northeast		Southeast	
Percent of Cows With Docked Tails	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
0	68.6	(3.7)	48.3	(3.0)	42.7	(4.2)	61.0	(8.5)
1.0 to 24.9	20.1	(3.3)	16.6	(2.3)	17.2	(2.9)	23.0	(7.9)
25.0 to 75.9	4.4	(1.4)	10.0	(1.9)	10.0	(2.1)	4.2	(2.0)
76.0 to 99.9	3.0	(1.0)	7.9	(1.4)	10.3	(1.4)	6.5	(3.0)
100.0	3.9	(1.6)	17.2	(2.1)	19.8	(2.1)	5.3	(2.9)
Total	100.0		100.0		100.0		100.0	

Nearly a third of all cows (32.9 percent) had docked tails at the time of the interview. Medium-sized operations had the highest percentage of cows (44.3 percent) with docked tails.

c. Percentage of cows with docked tails (as a percentage of cow inventory at time of interview), by herd size:

Percent Cows							
Herd Size (Number of Dairy Cows)							
Small (Less than 100)		Medium (100-499)		Large (500 or More)		All Operations	
Percent	Std. Error	Percent	Std. Error	Percent	Std. Error	Percent	Std. Error
27.3	(2.3)	44.3	(2.6)	27.0	(2.7)	32.9	(1.5)

At the time of the interview, the Midwest and the Northeast regions had the highest percentage (47.6 and 45.6 percent, respectively) of cows with docked tails.

d. Percentage of cows with docked tails (as a percentage of cow inventory at time of interview), by region:

Percent Cows							
Region							
West		Midwest		Northeast		Southeast	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
12.8	(2.1)	47.6	(2.3)	45.6	(3.1)	24.4	(6.2)

11. Culling practices

Culling dairy cows can be an important income source. Culled animals may be categorized into either forced or unforced culls. Forced culls include animals with illnesses and/or injuries that are not economically viable for treatment. Unforced culls usually occur due to decreased milk production, and decreased milk production is commonly due to reproductive problems and extended lactation length. Subclinical diseases such as mastitis and Johne's disease also can lead to decreased milk production and culling. Unforced culling allows the owner time to optimize animal weights before culling. Operations participating in the Dairy 2002 study reported overall culling percentages below what has been reported nationwide by the Dairy Herd Improvement Association (DHIA). Dairy 2002 cull percentages include only cows that left operations alive, which accounts for part of the discrepancy between culling percentages reported here and nationwide culling rates reported by the DHIA. Cull rates across the United States, which include cow deaths for DHIA calculations, are generally reported to be between 30 and 35 percent. For Dairy 2002, 24.9 percent of cows were reported culled in 2001. Large operations culled a larger percentage of cows (27.6 percent) than medium or small operations (23.5 and 23.3 percent, respectively).

a. Percentage of cows culled in 2001 by herd size:

Percent Cows							
Herd Size (Number of Dairy Cows)							
Small (Less than 100)		**Medium** (100-499)		**Large** (500 or More)		**All Operations**	
Percent	**Std. Error**	**Percent**	**Std. Error**	**Percent**	**Std. Error**	**Percent**	**Std. Error**
23.3	(0.6)	23.5	(0.6)	27.6	(0.7)	24.9	(0.4)

Culling percentages ranged from 22.6 percent in the Northeast region to 26.3 percent in the West region.

b. Percentage of cows culled in 2001 by region:

Percent Cows							
Region							
West		**Midwest**		**Northeast**		**Southeast**	
Pct.	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
26.3	(0.7)	24.9	(0.6)	22.6	(0.6)	23.3	(1.3)

The majority of cows (70.7 percent) were reported to be in good body condition at the time of culling, while 29.3 percent of cows were reported to be in poor body condition at culling. Small operations had the highest percentage of cows (75.8 percent) in good body condition at culling compared to medium operations, which had the lowest percentage of cull cows (66.2 percent) in good body condition.

c. For cows that were culled, percentage of cows culled in 2001 by body condition and by herd size:

Percent Cows

Herd Size (Number of Dairy Cows)

	Small (Less than 100)		**Medium** (100-499)		**Large** (500 or More)		**All Operations**	
Body Condition	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Good	75.8	(1.2)	66.2	(1.3)	70.6	(1.4)	70.7	(0.8)
Poor	24.2	(1.2)	33.8	(1.3)	29.4	(1.4)	29.3	(0.8)
Total	100.0		100.0		100.0		100.0	

The percentage of cull cows in good body condition was approximately the same level across all regions.

d. For cows that were culled, percentage of cows culled in 2001, by body condition and by region:

Percent Cows

Region

	West		**Midwest**		**Northeast**		**Southeast**	
Body Condition	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Good	72.7	(1.4)	69.6	(1.2)	71.1	(1.6)	63.3	(3.3)
Poor	27.3	(1.4)	30.4	(1.2)	28.9	(1.6)	36.7	(3.3)
Total	100.0		100.0		100.0		100.0	

Days in milk at time of culling is a predictor of forced versus unforced culls. Cows early in lactation are more likely to be forced culls, while later lactation animals are usually unforced culls. The majority of cows (60.3 percent) were culled at 200 or more days in milk. Approximately a fourth of cull cows (24.1 percent) were culled from 50 to 199 days in milk, while 15.6 percent were culled at less than 50 days in milk. Medium and large operations culled more cows (16.7 and 17.2 percent, respectively) at less than 50 days in milk compared to small operations (12.2 percent). Regional differences by days in milk at time of culling were negligible.

e. Percentage of cows culled in 2001 by days in milk (DIM) at time of culling and by herd size:

Percent Cows

Herd Size (Number of Dairy Cows)

	Small (Less than 100)		**Medium** (100-499)		**Large** (500 or More)		**All Operations**	
Days in Milk	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Less than 50	12.2	(0.7)	16.7	(1.0)	17.2	(0.9)	15.6	(0.5)
50 to 199	25.7	(1.3)	24.2	(1.2)	22.8	(1.2)	24.1	(0.7)
200 or more	62.1	(1.5)	59.1	(1.4)	60.0	(1.6)	60.3	(0.9)
Total	100.0		100.0		100.0		100.0	

f. Percentage of cows culled in 2001 by days in milk (DIM) at time of culling and by region:

	Percent Cows							
	Region							
	West		Midwest		Northeast		Southeast	
Days in Milk	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Less than 50	15.1	(0.8)	16.0	(0.8)	15.5	(1.2)	16.0	(2.6)
50 to 199	22.1	(1.2)	25.3	(1.2)	26.1	(1.4)	24.4	(2.3)
200 or more	62.8	(1.6)	58.7	(1.4)	58.4	(1.7)	59.6	(3.0)
Total	100.0		100.0		100.0		100.0	

C. Milking Procedures

1. Udder and teat preparation

Proper teat preparation prior to milking is crucial for preventing new intramammary infections. Premilking teat preparation not only reduces environmental bacteria on the teat surface but also reduces bacteria counts in milk. Overall, 65.0 percent of dairy operations used a waterless teat preparation method (WTPM) in both summer and winter. The percentage of operations that used a WTPM was nearly the same in summer (66.4 percent of operations) and winter (66.6 percent of operations). Small and medium operations were more likely to use a WTPM (64.2 and 71.9 percent, respectively) than large operations (39.6 percent). In the Northeast region, 82.6 percent of operations used a WTPM compared to 61.9 percent in the Southeast region, 61.3 percent in the Midwest region, and 38.3 percent in the West region.

a. Percentage of operations that primarily used a waterless teat preparation method to clean cow udders or teats prior to milking during summer, winter, and both summer and winter, by herd size:

Percent Operations

Herd Size (Number of Dairy Cows)

Season Used	Small (Less than 100) Pct.	Std. Error	Medium (100-499) Pct.	Std. Error	Large (500 or More) Pct.	Std. Error	All Operations Pct.	Std. Error
Summer	65.8	(2.6)	72.9	(2.6)	41.2	(3.3)	66.4	(2.0)
Winter	65.5	(2.7)	74.8	(2.6)	40.3	(3.3)	66.6	(2.0)
Both seasons	64.2	(2.7)	71.9	(2.7)	39.6	(3.3)	65.0	(2.0)

i. Percentage of operations that primarily used a waterless teat preparation method to clean cow teats prior to milking during summer, winter, and both summer and winter, by region:

Percent Operations

Region

Season Used	West Pct.	Std. Error	Midwest Pct.	Std. Error	Northeast Pct.	Std. Error	Southeast Pct.	Std. Error
Summer	40.1	(4.2)	62.8	(3.0)	83.4	(3.0)	65.0	(6.0)
Winter	44.0	(4.5)	63.2	(3.0)	82.6	(3.0)	61.9	(6.0)
Both seasons	38.3	(4.2)	61.3	(3.0)	82.6	(3.0)	61.9	(6.0)

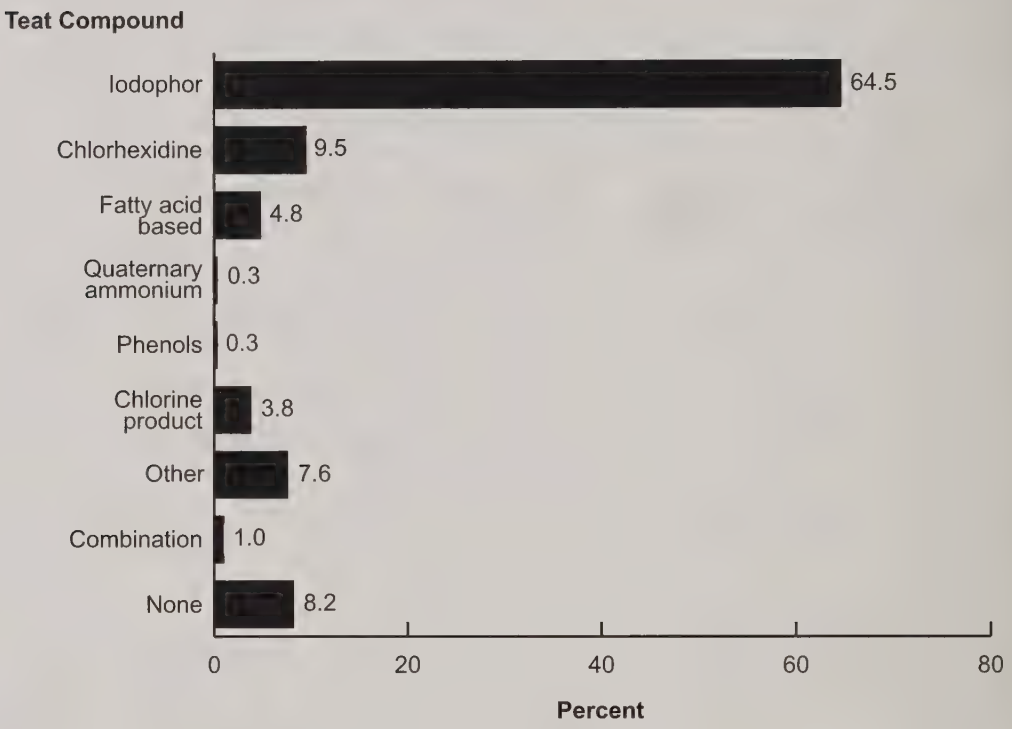
There are many groups of teat disinfectant compounds approved for use on U.S. dairies. The National Mastitis Council publishes annually a table that presents results of all peer reviewed studies on teat disinfectants by compound. This information helps establish recommendations for specific products proven effective on dairy operations. Of all operations that reported using a waterless teat preparation method, 64.5 percent reported using a predip containing iodophor as a premilking teat disinfectant in both summer and winter. Compounds containing chlorhexidine were used as a predip on 9.5 percent of operations. Overall, 8.2 percent of operations using a waterless teat preparation method did not use a predip, suggesting that no teat preparation was performed prior to milking on these operations.

ii. For operations that used a waterless teat preparation method, percentage of operations by predip compounds used during summer, winter, and both summer and winter:

	Percent Operations					
	Summer		Winter		Both Summer and Winter	
Compound	Percent	Std. Error	Percent	Std. Error	Percent	Std. Error
Iodophor (iodine containing)	64.7	(2.4)	65.1	(2.4)	64.5	(2.5)
Chlorhexidine	9.4	(1.6)	10.6	(1.7)	9.5	(1.6)
Fatty acid based	4.7	(1.1)	4.7	(1.1)	4.8	(1.1)
Quaternary ammonium	0.3	(0.3)	0.5	(0.4)	0.3	(0.3)
Phenols	0.3	(0.2)	0.3	(0.2)	0.3	(0.2)
Chlorine product	3.7	(0.8)	3.7	(0.8)	3.8	(0.8)
Other	7.1	(1.2)	6.9	(1.2)	7.6	(1.2)
Combination	N/A		N/A		1.0	(0.5)
None	9.8	(1.6)	8.2	(1.5)	8.2	(1.5)
Total	100.0		100.0		100.0	

*Combination of any two compounds

For Operations that Used a Waterless Teat Preparation Method, Percent of Operations by Predip Teat Compound Used During Both Summer and Winter



Overall, 31.8 percent of operations used a teat wash method with water in both summer and winter to clean cow udders and teats prior to milking. Large operations (58.1 percent) and small operations (32.8 percent) were more likely to use a teat wash method than medium operations (24.2 percent).

b. Percentage of operations that used a teat wash method with water to clean cow udders and teats prior to milking during summer, winter, and both summer and winter, by herd size:

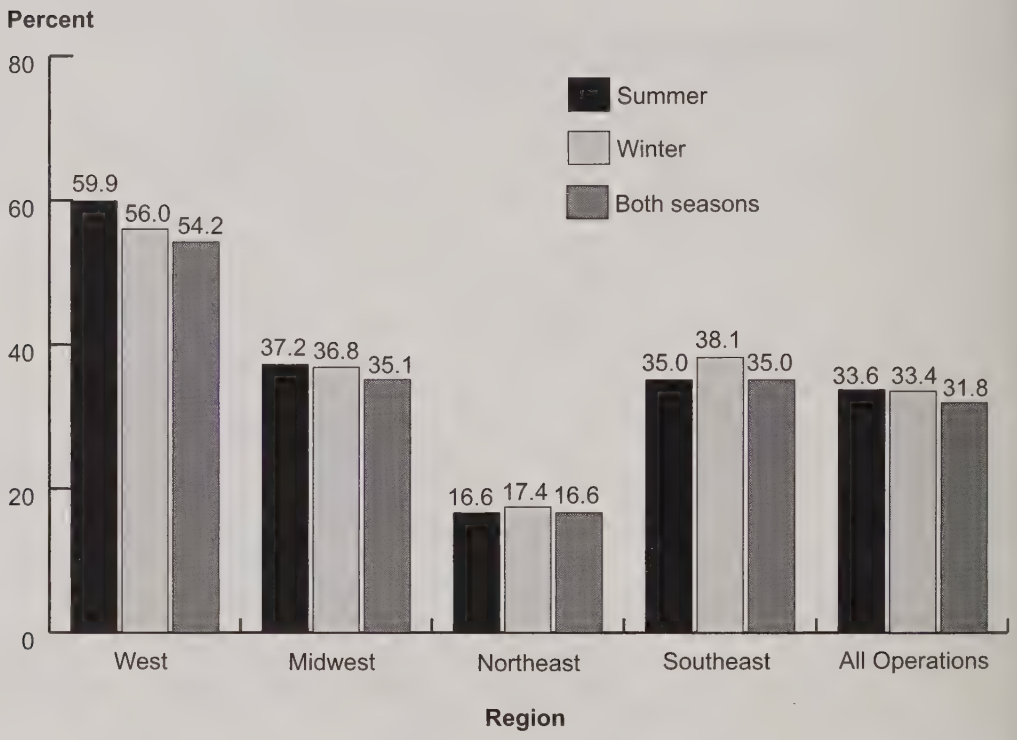
	Percent Operations							
	Herd Size (Number of Dairy Cows)							
	Small (less than 100)		**Medium** (100-499)		**Large** (500 or More)		**All Operations**	
Season Used	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Summer	34.2	(2.6)	27.1	(2.6)	58.8	(3.3)	33.6	(2.0)
Winter	34.5	(2.7)	25.2	(2.6)	59.7	(3.3)	33.4	(2.0)
Both seasons	32.8	(2.6)	24.2	(2.6)	58.1	(3.4)	31.8	(2.0)

The West region had the highest percentage of operations (54.2 percent) using a teat wash method with water in both summer and winter. The Northeast region had the lowest percentage of operations (16.6 percent) using a teat wash method with water. Essentially, the same percentage of operations in the Midwest (35.1 percent) and Southeast (35.0) used a teat wash method with water in both summer and winter. The percentage of operations using a teat wash method with water did not vary significantly between seasons.

i. Percentage of operations that used a teat wash method with water to clean cow udders and teats prior to milking during summer, winter, and both summer and winter, by region:

	Percent Operations							
	Region							
	West		**Midwest**		**Northeast**		**Southeast**	
Season Used	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Summer	59.9	(4.2)	37.2	(3.0)	16.6	(3.0)	35.0	(6.0)
Winter	56.0	(4.5)	36.8	(3.0)	17.4	(3.0)	38.1	(6.0)
Both seasons	54.2	(4.5)	35.1	(3.0)	16.6	(3.0)	35.0	(6.0)

Percent of Operations that Used a Teat Wash Method with Water to Clean Cow Udders and Teats Prior to Milking During Summer, Winter, and Both Summer and Winter, by Region



Teat wash methods of teat preparation include wash pen, hose in the parlor, and single- or multiple-use wet cloth or paper towel. For large operations, wash pen was the most common teat wash method (91.5 percent of operations). Single-use wet cloth or paper towel were the most common teat wash methods on small operations.

ii. For operations that used a teat wash method during summer, winter, and both summer and winter, percentage of operations by teat wash method used to clean cow udders and teats prior to milking, and by herd size:

Percent Operations

		Herd Size (Number of Dairy Cows)							
		Small (less than 100)		**Medium** (100-499)		**Large** (500 or More)		**All Ops.**	
Teat Wash Method	**Season Used**	**Pct.**	**Std. Err.**	**Pct.**	**Std. Err.**	**Pct.**	**Std. Err.**	**Pct.**	**Std. Err.**
Wash pen	Summer	0.0	(--)	26.0	(5.5)	91.4	(3.1)	11.6	(1.4)
	Winter	1.3	(1.3)	26.3	(5.5)	91.8	(3.1)	12.5	(1.6)
	Both	0.0	(--)	27.4	(5.7)	91.5	(3.1)	11.9	(1.4)
Hose in parlor	Summer	13.2	(3.0)	46.8	(6.0)	49.1	(5.9)	22.2	(2.6)
	Winter	12.7	(3.0)	46.1	(6.1)	54.8	(5.9)	21.8	(2.6)
	Both	11.9	(3.0)	46.4	(6.2)	48.0	(6.0)	20.8	(2.6)
Single-use wet cloth or paper towel	Summer	60.6	(4.8)	44.6	(6.4)	31.3	(5.7)	55.4	(3.8)
	Winter	62.9	(4.7)	39.3	(6.0)	29.7	(5.6)	56.2	(3.8)
	Both	61.0	(4.9)	37.3	(6.1)	27.5	(5.6)	54.2	(3.9)
Multiple-use wet cloth or paper towel	Summer	28.2	(4.4)	19.0	(4.8)	16.5	(4.7)	25.6	(3.4)
	Winter	27.3	(4.3)	21.3	(5.1)	14.5	(4.4)	25.3	(3.3)
	Both	26.8	(4.4)	20.9	(5.2)	13.4	(4.4)	24.7	(3.4)
Other	Summer	2.8	(1.5)	0.5	(0.5)	1.1	(0.9)	2.3	(1.1)
	Winter	1.9	(1.2)	2.7	(2.1)	1.1	(0.9)	2.0	(1.0)
	Both	2.0	(1.3)	0.6	(0.5)	1.2	(0.9)	1.7	(1.0)

Single-use wet cloth or paper towel were the most common teat washing methods used in the Midwest and Northeast regions. In the West region, wash pen was used most commonly (74.2 percent of operations). Use of a hose in the parlor was more common in the West and Southeast regions (48.1 and 41.0 percent of operations, respectively).

iii. For operations that used a teat wash method during summer, winter, and both summer and winter, percentage of operations by teat wash method used to clean cow udders and teats prior to milking, and by region:

Percent Operations

		Region							
		West		Midwest		Northeast		Southeast	
Teat Wash Method	Season Used	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.	Pct.	Std. Err.
Wash pen	Summer	68.8	(6.2)	0.0	(--)	0.0	(--)	8.6	(2.5)
	Winter	73.1	(5.0)	1.5	(1.5)	0.0	(--)	6.9	(2.0)
	Both	74.2	(5.0)	0.0	(--)	0.0	(--)	7.6	(2.2)
Hose in parlor	Summer	48.1	(5.9)	13.7	(3.0)	19.4	(7.6)	47.0	(11.4)
	Winter	52.1	(6.0)	12.9	(3.0)	20.9	(7.5)	38.3	(10.9)
	Both	48.1	(6.1)	12.4	(3.0)	19.4	(7.6)	41.0	(11.4)
Single-use wet cloth or paper towel	Summer	43.4	(6.7)	58.7	(5.2)	59.3	(9.4)	44.9	(11.6)
	Winter	34.7	(5.8)	61.1	(5.1)	58.8	(9.1)	53.7	(11.1)
	Both	32.4	(5.8)	59.3	(5.3)	59.3	(9.4)	44.9	(11.6)
Multiple-use wet cloth or paper towel	Summer	15.3	(4.1)	29.6	(4.8)	21.3	(7.4)	20.5	(8.6)
	Winter	16.1	(4.3)	29.8	(4.8)	20.5	(7.1)	14.3	(7.1)
	Both	15.3	(4.4)	28.8	(4.9)	21.3	(7.4)	15.6	(7.7)
Other	Summer	0.0	(--)	3.3	(1.8)	0.0	(--)	2.3	(1.7)
	Winter	2.5	(2.4)	2.3	(1.5)	0.0	(--)	2.1	(1.5)
	Both	0.0	(--)	2.4	(1.5)	0.0	(--)	2.3	(1.7)

To decrease the spread of bacteria from one cow to another, single-use cloths or paper towels are recommended for drying teats of individual cows. In both seasons, single-use paper towel was the drying method reported most frequently (47.3 percent of operations) on operations that used a teat wash method. Air-drying was the next most common drying method (26.6 percent of operations). The method of teat drying did not vary substantially between summer and winter. The Dairy 2002 study questionnaire did not address how operations routinely removed predips.

iv. For operations that used a teat wash method during summer, winter, and both summer and winter, percentage of operations by primary drying method used prior to milking:

	Percent Operations					
	Summer		Winter		Both Seasons	
Drying Method	Percent	Std. Error	Percent	Std. Error	Percent	Std. Error
Single-use cloth towel	10.2	(2.2)	7.9	(1.8)	7.8	(1.9)
Multiple-use cloth towel	7.4	(1.6)	7.0	(1.5)	7.0	(1.5)
Single-use paper towel	49.7	(3.9)	50.8	(3.8)	47.3	(4.0)
Multiple-use paper towel	4.2	(1.7)	5.4	(1.8)	3.5	(1.5)
Nothing used-air dry	27.0	(3.4)	27.4	(3.4)	26.6	(3.5)
Other	1.5	(1.0)	1.5	(1.0)	1.5	(1.1)
Combination*	N/A	(--)	N/A	(--)	6.3	(1.9)
Total	100.0		100.0		100.0	

*Combination of any two methods

2. Postdip compounds

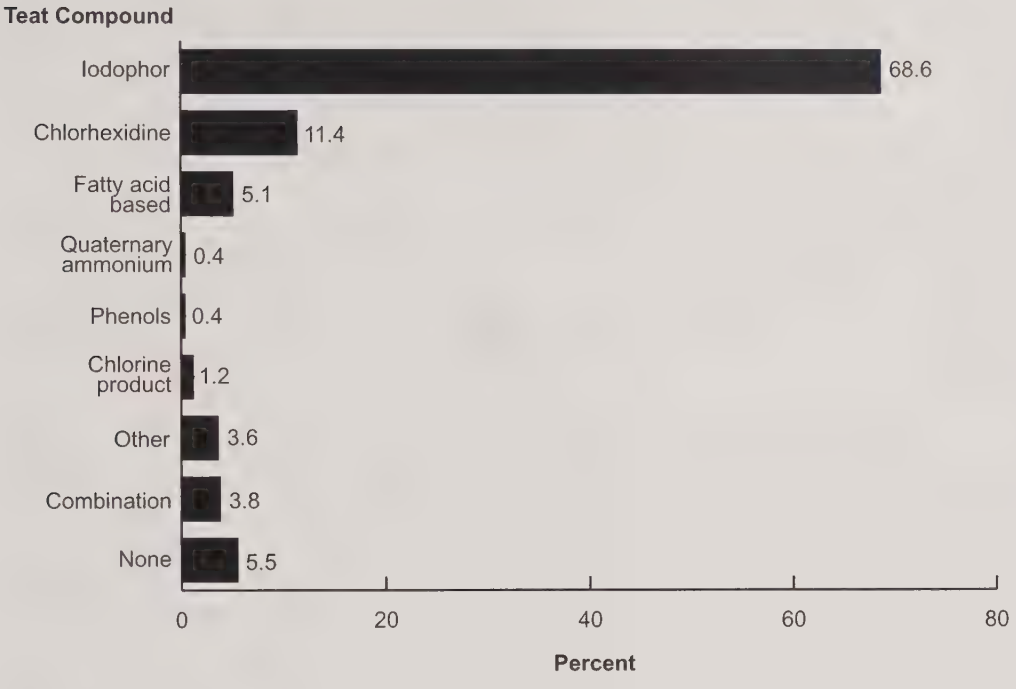
Postmilking teat disinfection kills bacteria transferred to the teat by milkers or milking equipment. Postmilking teat disinfection is targeted at decreasing the transfer of contagious mastitis pathogens. Compounds containing iodophor, followed by compounds with chlorhexidine, were the most common postmilking teat disinfectants used. The percentage of operations using postdip compounds did not vary by season. Only 5.5 percent of operations did not use postmilking teat disinfectant in both seasons.

a. For all operations, percentage of operations by postdip compounds used primarily in summer, winter, and both summer and winter:

	Percent Operations					
	Summer		Winter		Both Seasons	
Compounds	Percent	Std. Error	Percent	Std. Error	Percent	Std. Error
Iodophor (iodine containing)	71.1	(1.9)	69.7	(2.0)	68.6	(2.0)
Chlorhexidine	11.4	(1.4)	12.1	(1.4)	11.4	(1.4)
Fatty acid based	5.4	(0.8)	6.2	(0.9)	5.1	(0.8)
Quaternary ammonium	0.4	(0.3)	0.5	(0.3)	0.4	(0.3)
Phenols	0.4	(0.2)	0.4	(0.2)	0.4	(0.2)
Chlorine product	1.2	(0.4)	1.2	(0.4)	1.2	(0.4)
Other	3.8	(0.8)	3.7	(0.8)	3.6	(0.8)
Combination*	N/A	(--)	N/A	(--)	3.8	(0.9)
None	6.3	(1.1)	6.2	(1.2)	5.5	(1.0)
Total	100.0		100.0		100.0	

*Combination of any two compounds

Percent of Operations by Postdip Compounds Used Primarily in Both Summer and Winter



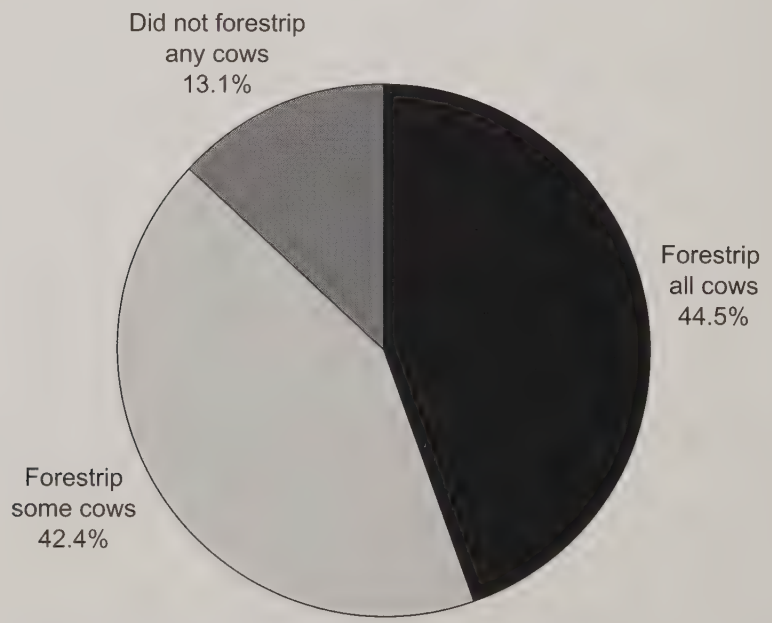
3. Forestripping

Removing a small amount of milk from the udder prior to milking (forestripping) helps identify new intramammary infections and improve milk quality. By forestripping, abnormal milk can be identified before a cow is milked and before the milk is put into the bulk tank. Overall, 86.9 percent of operations forestripped all or some cows prior to milking, while 13.1 percent did not forestrip any cows before milking.

a. Percentage of operations by use of forestripping prior to each milking:

Forestripping	Percent	Standard Error
Forestrip all cows	44.5	(2.1)
Forestrip some cows	42.4	(2.1)
Did not forestrip any cows	13.1	(1.5)
Total	100.0	

Percent of Operations by Use of Forestripping Prior to Each Milking



#1057

4. Equipment and practices

Milkers can transfer mastitis-causing pathogens from their hands to the teats of noninfected cows. To help prevent pathogen transfer, it is recommended that milkers wear latex or nitrile gloves during milking. Only 32.9 percent of operations reported that milkers wore gloves to milk all cows.

a. Percentage of operations where milkers wore gloves to milk all cows:

Percent	Standard Error
32.9	(1.9)

Milking units that incorporate backflush systems are designed to remove pathogens from milking units immediately after each cow is milked. Backflush systems are used to prevent contagious pathogens from spreading from cow to cow via milking equipment. Backflush systems were used on 6.7 percent of all operations. Nearly one in five large operations (20.7 percent) used the systems while smaller operations used it less frequently (9.8 percent of medium operations and 4.9 percent of small operations). The West region had the highest percentage of operations (22.3 percent) using a backflush system (table c).

b. Percentage of operations that used a backflush system in milking units, by herd size:

Percent Operations							
Herd Size (Number of Dairy Cows)							
Small (less than 100)		**Medium** (100-499)		**Large** (500 or More)		**All Operations**	
Percent	**Std. Error**	**Percent**	**Std. Error**	**Percent**	**Std. Error**	**Percent**	**Std. Error**
4.9	(1.1)	9.8	(1.7)	20.7	(3.1)	6.7	(0.9)

c. Percentage of operations that used a backflush system in milking units by region:

Percent Operations							
Region							
West		Midwest		Northeast		Southeast	
Percent	Std. Error	Percent	Std. Error	Percent	Std. Error	Percent	Std. Error
22.3	(3.1)	6.4	(1.3)	2.4	(1.2)	5.6	(2.5)

Removing milking machines from teats is done either manually or mechanically. Manual removal may lead to over milking, which can cause teat-end damage and decreased resistance to pathogen invasion. Although automatic takeoffs, or automatic cluster removers (ACRs), can also lead to over milking if not properly set and maintained, the probability of over milking is reduced. More than 9 out of 10 large operations (93.3 percent) used automatic takeoffs, compared to 71.0 percent of medium operations and 21.3 percent of small operations. The West region had the highest percentage of operations (78.7 percent) that used automatic takeoffs (table e).

d. Percentage of operations that used automatic takeoffs, by herd size:

Percent Operations							
Herd Size (Number of Dairy Cows)							
Small (less than 100)		Medium (100-499)		Large (500 or More)		All Operations	
Percent	Std. Error	Percent	Std. Error	Percent	Std. Error	Percent	Std. Error
21.3	(2.1)	71.0	(2.8)	93.3	(1.5)	36.0	(1.8)

e. Percentage of operations that used automatic takeoffs, by region:

Percent Operations							
Region							
West		Midwest		Northeast		Southeast	
Percent	Std. Error	Percent	Std. Error	Percent	Std. Error	Percent	Std. Error
78.7	(3.8)	31.6	(2.4)	30.6	(3.1)	38.4	(8.2)

5. Frequency of milking

Overall, 93.6 percent of operations (representing 78.6 percent of cows) milked twice daily, while 5.8 percent of operations (representing 21.2 percent of cows) milked three or more times a day. Only a small percentage of operations milked less than twice daily or more than three times daily.

a. Percentage of operations (and percentage of cows on these operations) by number of times per day the majority of cows were milked:

Milking Frequency (Per Day)	Percent Operations	Standard Error	Percent Cows	Standard Error
Once	0.5	(0.4)	0.1	(0.1)
Twice	93.6	(0.8)	78.6	(1.7)
3 times	5.8	(0.7)	21.2	(1.7)
More than 3 times	0.1	(0.1)	0.1	(0.1)
Total	100.0		100.0	

6. Vaccines given for mastitis and *Salmonella*

Vaccines against coliform mastitis and *Salmonella* have been shown to decrease the incidence and severity of mastitis caused by gram-negative bacteria. The percentage of operations that reported giving coliform mastitis vaccines to a majority of cows during 2001 was 35.8 percent, which accounted for 57.1 percent of all cows.

a. Percentage of operations (and percentage of cows on these operations) that administered coliform mastitis vaccine to the majority of cows during the 12 months prior to the interview:

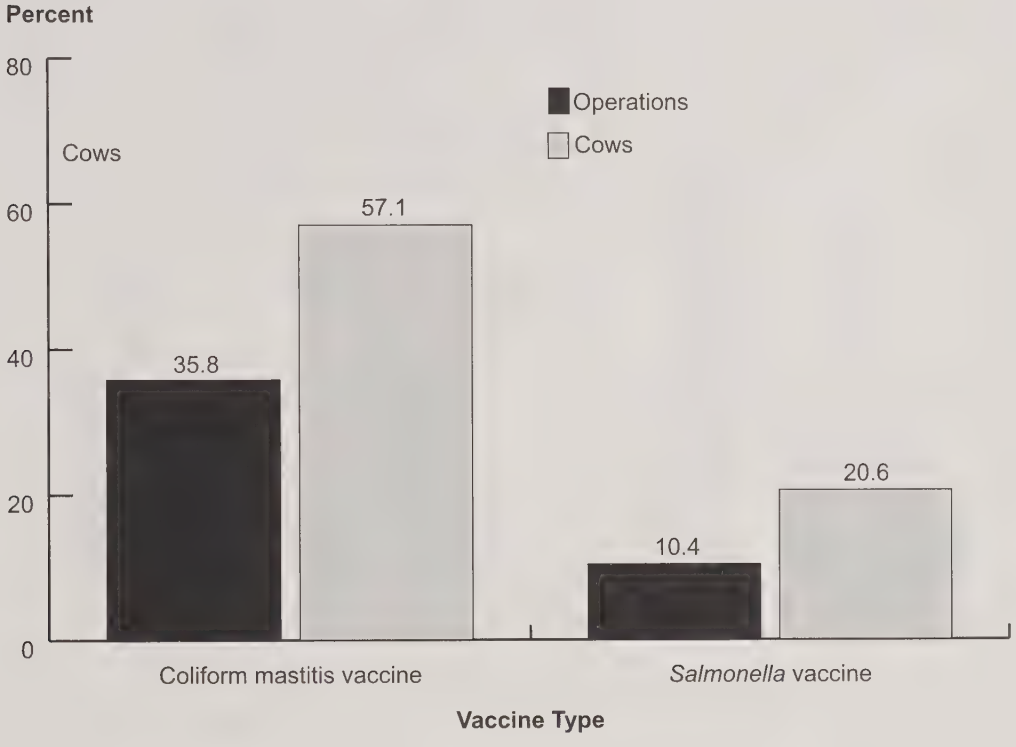
Percent Operations	Standard Error	Percent Cows	Standard Error
35.8	(2.0)	57.1	(1.8)

Only 10.4 percent of operations representing 20.6 percent of cows administered *Salmonella* vaccine to the majority of cows.

b. Percentage of operations (and percentage of cows on these operations) that administered *Salmonella* vaccine to the majority of cows during the 12 months prior to the interview:

Percent Operations	Standard Error	Percent Cows	Standard Error
10.4	(1.3)	20.6	(1.7)

Percent of Operations (and Percent of Cows on These Operations) that Administered Coliform Mastitis and *Salmonella* Vaccines to the Majority of Cows During the 12 Months Prior to the Interview



7. Familiarity with Mycoplasma mastitis

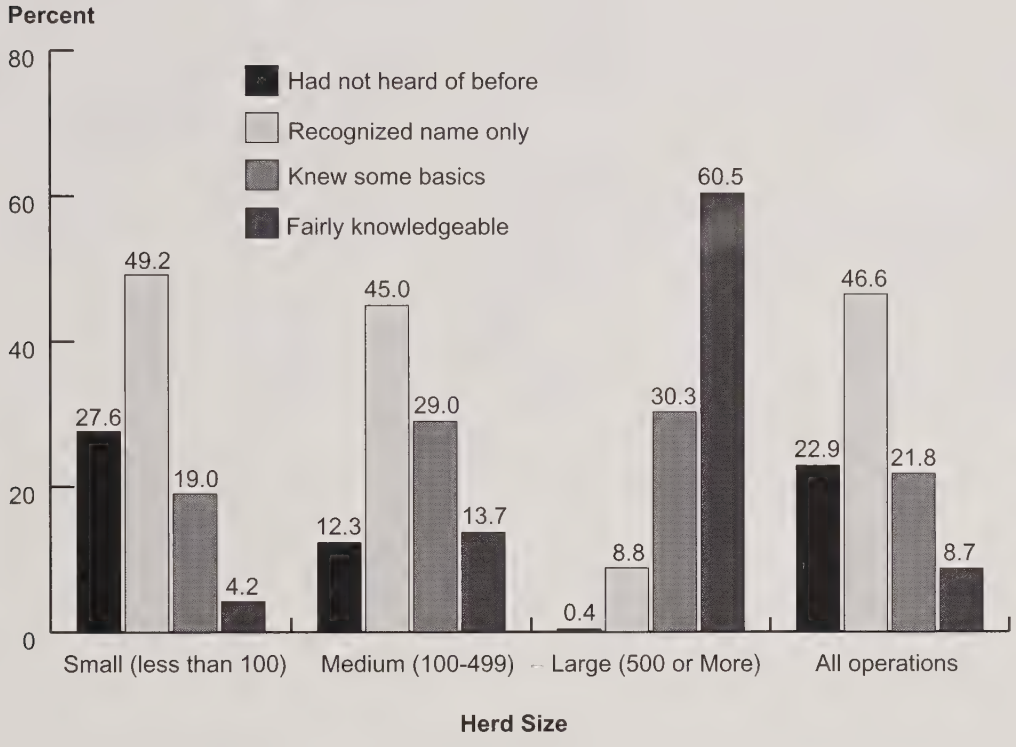
Mycoplasma is a contagious organism transferred from cow to cow that can cause mastitis. Diagnosis requires special culture techniques. There is no effective treatment. Only 8.7 percent of operations were fairly knowledgeable about the disease, while 22.9 percent had never heard of it. Less than half of operations (46.6 percent) recognized the name only. Familiarity with Mycoplasma mastitis increased as herd size increased. The majority of large herds (60.5 percent) were fairly knowledgeable about Mycoplasma mastitis, compared to only 4.2 percent of small herds.

a. Percentage of operations by familiarity with Mycoplasma mastitis and by herd size:

Percent Operations

	Herd Size (Number of Dairy Cows)							
	Small (Less than 100)		**Medium** (100-499)		**Large** (500 or More)		**All Operations**	
Level of Familiarity	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**	**Pct.**	**Std. Error**
Had not heard of before	27.6	(2.6)	12.3	(2.1)	0.4	(0.4)	22.9	(2.0)
Recognized name only	49.2	(2.8)	45.0	(3.0)	8.8	(2.2)	46.6	(2.2)
Knew some basics	19.0	(2.1)	29.0	(2.9)	30.3	(3.9)	21.8	(1.7)
Fairly knowledgeable	4.2	(1.1)	13.7	(2.0)	60.5	(4.1)	8.7	(1.0)
Total	100.0		100.0		100.0		100.0	

Percent of Operations by Familiarity with Mycoplasma Mastitis, by Herd Size

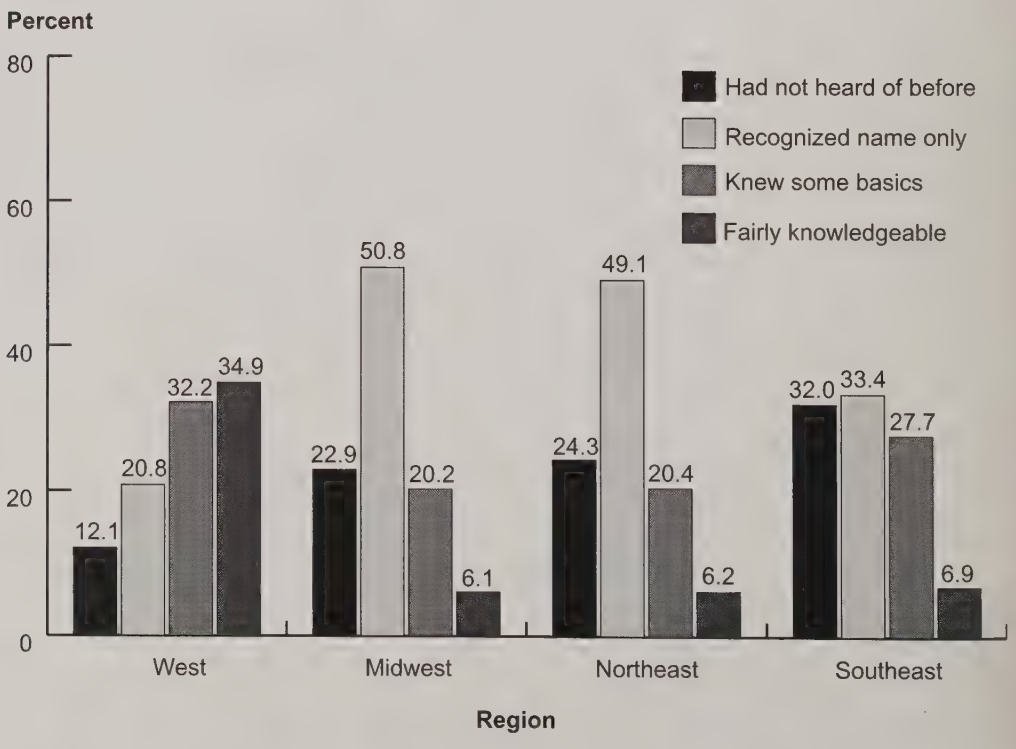


The West region had the highest percentage of operations (34.9 percent) fairly knowledgeable about Mycoplasma mastitis, compared to about 6 to 7 percent of operations in the other regions.

b. Percentage of operations by familiarity with Mycoplasma mastitis, by region:

	Percent Operations							
	Region							
	West		Midwest		Northeast		Southeast	
Level of Familiarity	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Had not heard of before	12.1	(4.6)	22.9	(2.7)	24.3	(3.9)	32.0	(6.2)
Recognized name only	20.8	(3.8)	50.8	(3.0)	49.1	(4.2)	33.4	(8.5)
Knew some basics	32.2	(4.5)	20.2	(2.3)	20.4	(3.1)	27.7	(8.0)
Fairly knowledgeable	34.9	(4.0)	6.1	(1.3)	6.2	(1.7)	6.9	(1.9)
Total	100.0		100.0		100.0		100.0	

Percent of Operations by Familiarity with Mycoplasma Mastitis, by Region



D. Antibiotic Use

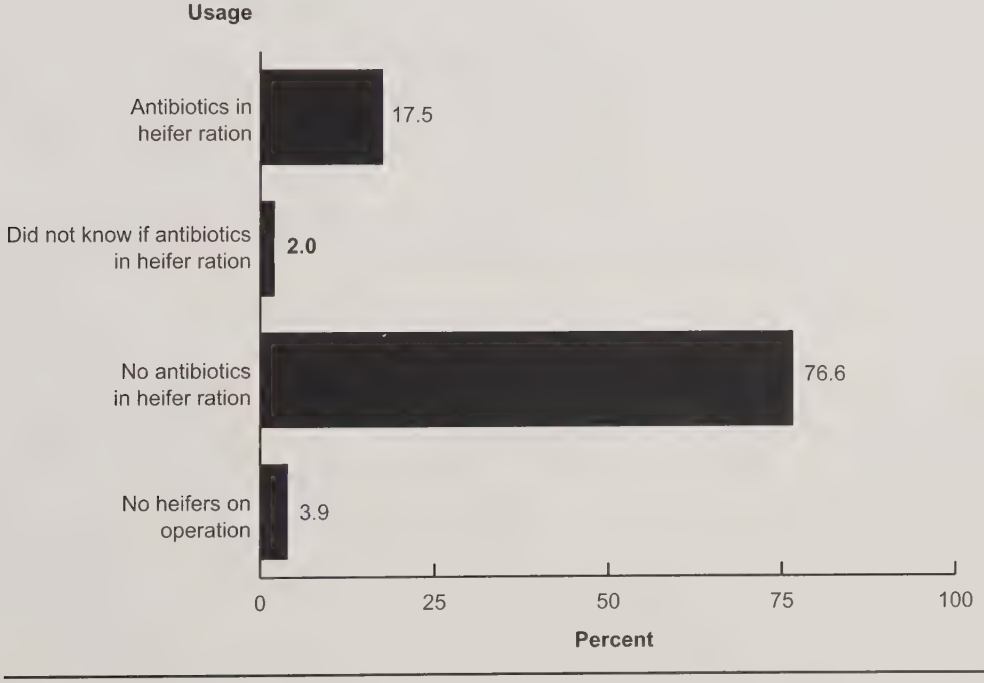
1. Usage in rations for weaned heifers

Over three-fourths of operations (76.6 percent) did not use antibiotics in rations for weaned dairy heifers during the 12 months prior to the interview. Less than a fifth of operations (17.5 percent) included antibiotics in heifer rations, and 2.0 percent did not know if antibiotics were included in heifer rations. Judicious use of antibiotics helps to prevent the development of pathogens resistant to antimicrobials.

a. Percentage of operations that used antibiotics in rations for weaned dairy heifers during the 12 months prior to the interview to prevent disease or promote growth:

Usage	Percent	Standard Error
Antibiotics in heifer ration	17.5	(1.5)
Did not know if antibiotics in heifer ration	2.0	(0.6)
No antibiotics in heifer ration	76.6	(1.7)
No heifers on operation	3.9	(0.7)
Total	100.0	

Percent of Operations that Used Antibiotics in Rations for Weaned Dairy Heifers During the 12 Months Prior to the Interview to Prevent Disease or Promote Growth

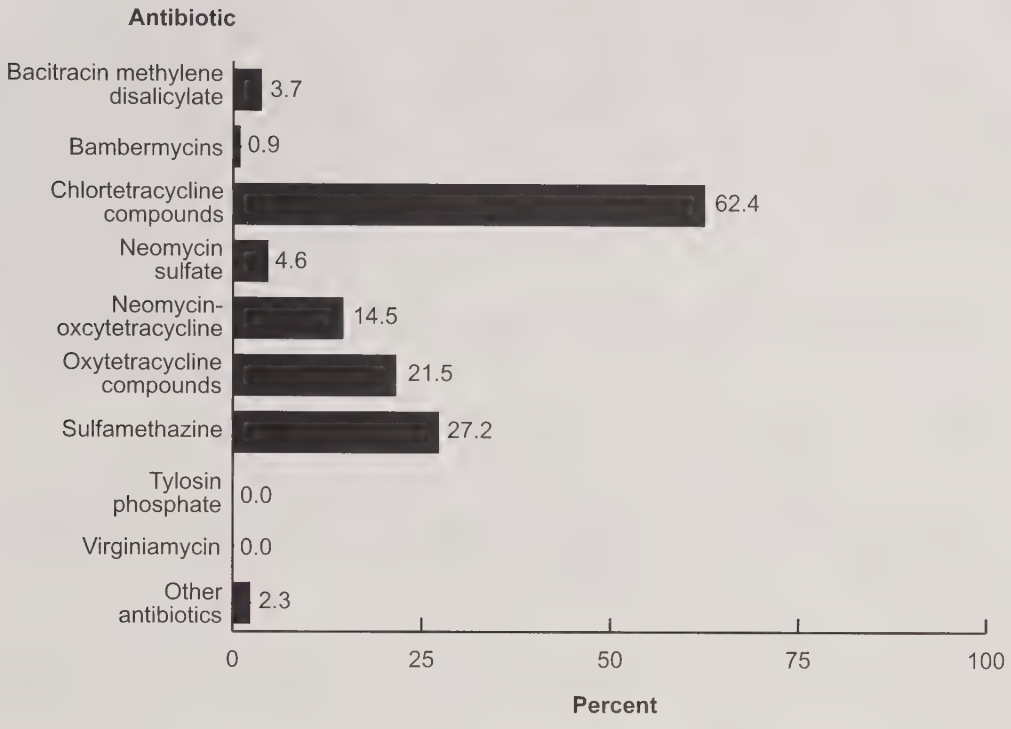


For operations that used antibiotics in the rations of dairy heifers, most used chlortetracycline compounds (62.4 percent) followed by equal use of sulfamethazine (27.2 percent) and oxytetracycline (21.5 percent).

b. For operations that used antibiotic in rations for weaned dairy heifers, percentage of operations by antibiotic used:

Antibiotic	Percent	Standard Error
Bacitracin methylene disalicylate	3.7	(1.8)
Bambermycins	0.9	(0.5)
Chlortetracycline compounds	62.4	(4.5)
Neomycin sulfate	4.6	(1.7)
Neomycin-oxytetracycline	14.5	(3.2)
Oxytetracycline compounds	21.5	(3.6)
Sulfamethazine	27.2	(4.1)
Tylosin phosphate	0.0	(0.0)
Virginiamycin	0.0	(--)
Other antibiotics	2.3	(2.1)

For Operations that Used Antibiotics in Rations for Weaned Dairy Heifers, Percent of Operations by Antibiotic Used



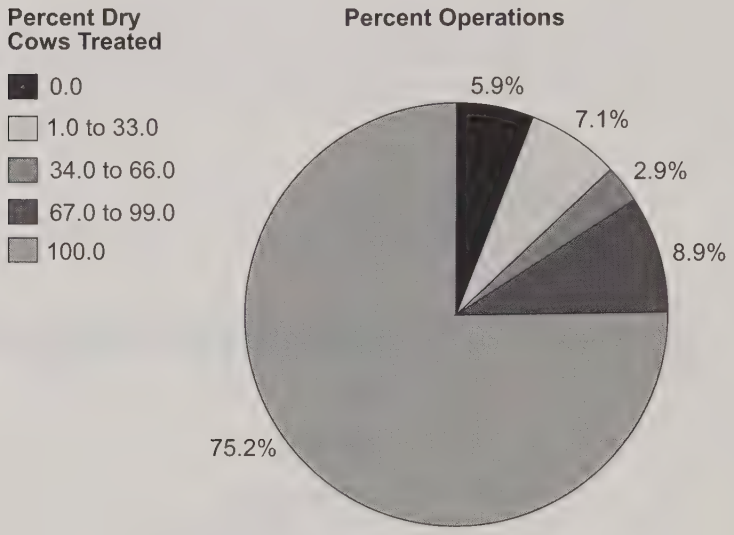
2. Treatment of dry cows

Overall, 75.2 percent of operations treated 100.0 percent of cows with dry cow intramammary antibiotics at the time of drying-off. Almost 6 percent of operations did not treat any cows with this type of antibiotic at drying-off.

a. Percentage of operations by percentage of cows treated during the 12 months prior to the interview with dry cow intramammary antibiotics at drying-off:

Percent of Dry Cows Treated	Percent Operations	Standard Error
0.0	5.9	(1.0)
1.0 to 33.0	7.1	(1.2)
34.0 to 66.0	2.9	(0.7)
67.0 to 99.0	8.9	(1.2)
100.0	75.2	(1.9)
Total	100.0	

Percent of Operations by Percent of Cows Treated During the 12 Months Prior to the Interview with Dry Cow Intramammary Antibiotics at Drying Off



The largest percentage of cows treated with any dry cow antibiotic were treated with cephapirin (42.1 percent) followed by penicillin G/dihydrostreptomycin (31.7 percent) and cloxacillin (12.8 percent).

b. Of dry cows treated* with an intramammary antibiotic, percentage of cows by antibiotic given during the 12 months prior to the interview:

Antibiotic Given	Percent* Cows	Standard Error
Cephapirin (benzathine)	42.1	(1.8)
Cloxacillin (benzathine)	12.8	(1.4)
Erythromycin	0.8	(0.3)
Novobiocin	5.7	(1.1)
Penicillin G (procaine)	1.3	(0.4)
Penicillin G (procaine)/dihydro-streptomycin	31.7	(2.0)
Penicillin G (procaine)/ novobiocin	5.8	(1.0)
Other	0.2	(0.1)

*Some cows may have been treated with more than one antibiotic.

E. Nutrient Management

1. Manure handling methods

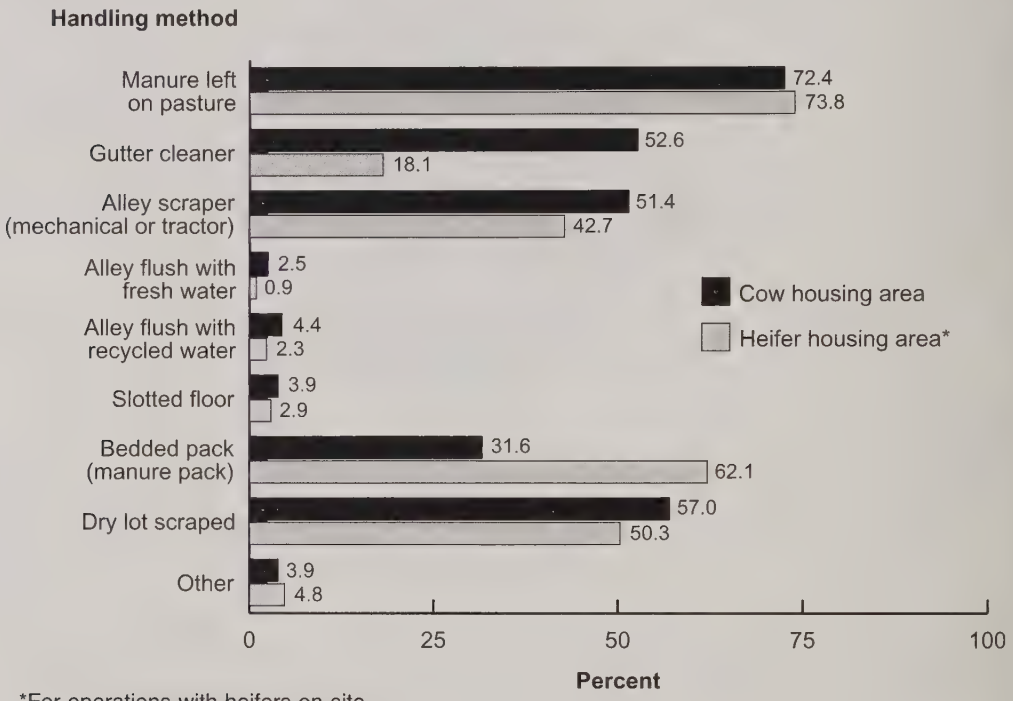
Common methods used for handling manure from cow housing areas included gutter cleaner (52.6 percent of operations), alley scraper (51.4 percent of operations), scraping a dry lot (57.0 percent of operations), and bedded manure packs (31.6 percent of operations). The manure handling methods for heifer housing areas were similar to those used for cows (alley scraper and scraping a dry lot). A larger percentage of operations used bedded manure pack in heifer housing areas than in cow housing areas (62.1 percent and 31.6 percent, respectively).

a. Percentage of operations by manure handling methods used in cow and weaned heifer housing areas:

	Percent Operations			
	Cow Housing Area		Heifer Housing Area*	
Handling Method	Percent	Standard Error	Percent	Standard Error
Manure left on pasture	72.4	(1.8)	73.8	(1.8)
Gutter cleaner	52.6	(1.9)	18.1	(1.8)
Alley scraper (mechanical or tractor)	51.4	(2.0)	42.7	(2.1)
Alley flush with fresh water	2.5	(0.5)	0.9	(0.3)
Alley flush with recycled water	4.4	(0.6)	2.3	(0.5)
Slotted floor	3.9	(0.6)	2.9	(0.7)
Bedded pack (manure pack)	31.6	(2.0)	62.1	(2.1)
Dry lot scraped	57.0	(2.1)	50.3	(2.2)
Other	3.9	(0.8)	4.8	(1.0)

*For operations that had heifers on-site.

Percent of Operations by Manure Handling Methods Used in Cow and Weaned Heifer Housing Areas



*For operations with heifers on-site

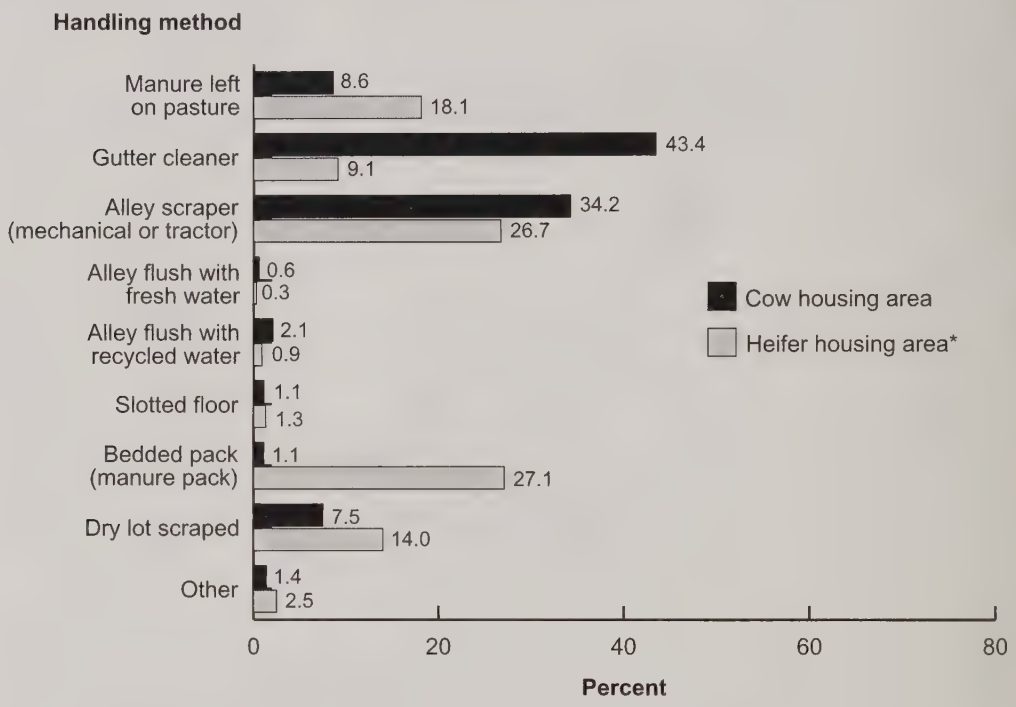
Most operations left manure on pasture for both cow and heifer housing areas, although the ***primary*** method used for cows was gutter cleaner (43.4 percent of operations). Bedded pack and alley scraper were the primary methods for heifers (27.1 and 26.7 percent of operations, respectively).

b. Percentage of operations by manure handling methods used for the ***majority*** of manure in cow and weaned heifer housing areas:

	Percent Operations			
	Cow Housing Area		Heifer Housing Area*	
Handling Method	Percent	Standard Error	Percent	Standard Error
Manure left on pasture	8.6	(1.2)	18.1	(1.7)
Gutter cleaner	43.4	(2.0)	9.1	(1.4)
Alley scraper (mechanical or tractor)	34.2	(1.9)	26.7	(1.9)
Alley flush with fresh water	0.6	(0.3)	0.3	(0.2)
Alley flush with recycled water	2.1	(0.3)	0.9	(0.2)
Slotted floor	1.1	(0.4)	1.3	(0.5)
Bedded pack (manure pack)	1.1	(0.5)	27.1	(2.0)
Dry lot scraped	7.5	(1.0)	14.0	(1.5)
Other	1.4	(0.6)	2.5	(0.7)
Total	100.0		100.0	

*For operations that had heifers on-site.

Percent of Operations by Manure Handling Methods Used for the *Majority* of Manure in Cow and Weaned Heifer Housing Areas



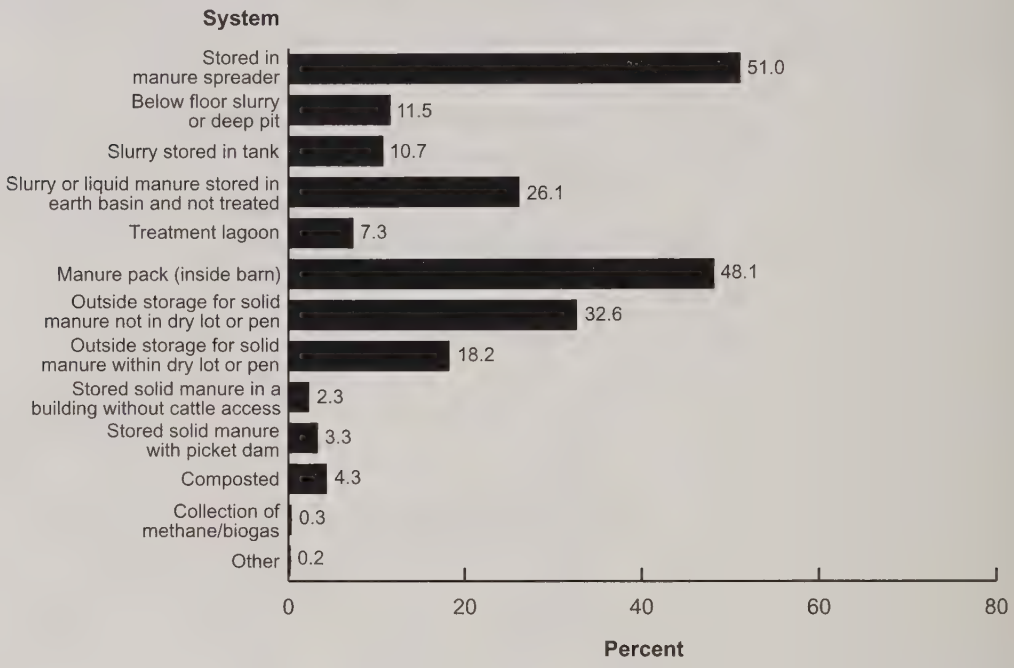
*For operations that had heifers on-site

2. Waste storage or treatment system
(Note: Tables 2a to 5g represent operations that had a manure removal system(s) other than pasture).
For operations that had manure removal systems other than pasture, most used manure spreaders for storage (51.0 percent), followed by a manure pack inside a barn (48.1 percent), outside storage for solid manure not in a dry lot or pen (32.6 percent), and slurry or liquid manure stored in an earth basin but not treated (26.1 percent).

a. Percentage of operations by waste storage or treatment system used:

System	Percent Operations	Standard Error
Stored in manure spreader	51.0	(2.0)
Below floor slurry or deep pit	11.5	(1.2)
Slurry stored in tank	10.7	(1.2)
Slurry or liquid manure stored in earth basin and not treated	26.1	(1.8)
Treatment lagoon	7.3	(0.8)
Manure pack (inside barn)	48.1	(2.1)
Outside storage for solid manure not in dry lot or pen	32.6	(2.0)
Outside storage for solid manure within dry lot or pen	18.2	(1.6)
Stored solid manure in a building without cattle access	2.3	(0.6)
Stored solid manure with picket dam	3.3	(0.7)
Composted	4.3	(0.9)
Collection of methane/biogas	0.3	(0.2)
Other	0.2	(0.1)

Percent of Operations by Waste Storage or Treatment System Used

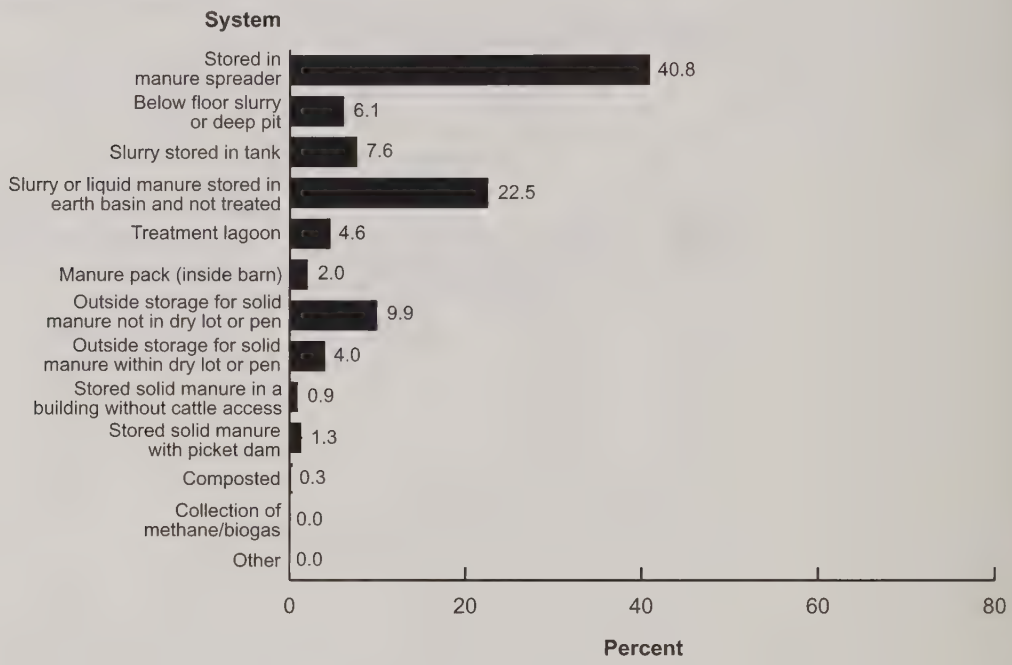


The two ***primary*** methods of storage were manure stored in a spreader (40.8 percent of operations) and slurry or liquid manure stored in an earth basin without treatment (22.5 percent of operations).

b. Percentage of operations by waste storage or treatment systems used for the ***majority*** of manure:

System	Percent Operations	Standard Error
Stored in manure spreader	40.8	(2.1)
Below floor slurry or deep pit	6.1	(1.0)
Slurry stored in tank	7.6	(1.1)
Slurry or liquid manure stored in earth basin and not treated	22.5	(1.7)
Treatment lagoon	4.6	(0.7)
Manure pack (inside barn)	2.0	(0.6)
Outside storage for solid manure not in dry lot or pen	9.9	(1.3)
Outside storage for solid manure within dry lot or pen	4.0	(0.8)
Stored solid manure in a building without cattle access	0.9	(0.4)
Stored solid manure with picket dam	1.3	(0.5)
Composted	0.3	(0.1)
Collection of methane/biogas	0.0	(--)
Other	0.0	(--)
Total	100.0	

Percent of Operations by Waste Storage or Treatment System Used for the *Majority* of Manure



3. Maximum manure storage capacity

Overall, 31.4 percent of operations had less than 7 days of storage capacity for manure on-farm; 10.7 percent, 24.9 percent and 13.7 percent of operations had 90 to 179 days, 180 to 364 days and 365 days or more, respectively. Operations with less than 7 days of storage capacity required that manure be applied to land, sold, or removed from the operation in some other manner at least once a week. In areas where freezing occurred, application of manure to frozen ground is problematic.

a. Percentage of operations by maximum manure storage capacity (as measured in days):

Capacity (Days)	Percent Operations	Standard Error
Less than 7 days	31.4	(2.1)
7 to 29 days	7.4	(1.1)
30 to 59 days	6.7	(1.2)
60 to 89 days	5.2	(1.0)
90 to 179 days	10.7	(1.2)
180 to 364 days	24.9	(1.7)
365 days or more	13.7	(1.4)
Total	100.0	

4. Manure use

Most operations (98.3 percent) applied manure to land either owned or rented by the operation. A smaller percentage (16.2 percent) of operations gave manure away; 4.8 percent sold it or received other compensation. The ***primary*** use of manure on most operations was to apply it to land (97.9 percent of operations) (table b).

a. Percentage of operations by method of manure usage:

Method	Percent Operations	Standard Error
Applied manure to land either owned or rented	98.3	(0.4)
Sold or received other compensation	4.8	(0.7)
Gave away	16.2	(1.5)
Used composted manure as bedding	1.8	(0.3)
Other	0.1	(0.1)

b. Percentage of operations by method of manure usage for the ***majority*** of manure:

Method	Percent Operations	Standard Error
Applied manure to land either owned or rented	97.9	(0.4)
Sold or received other compensation	0.7	(0.3)
Gave away	1.0	(0.3)
Used composted manure as bedding	0.3	(0.1)
Other	0.1	(0.1)
Total	100.0	

5. Manure application

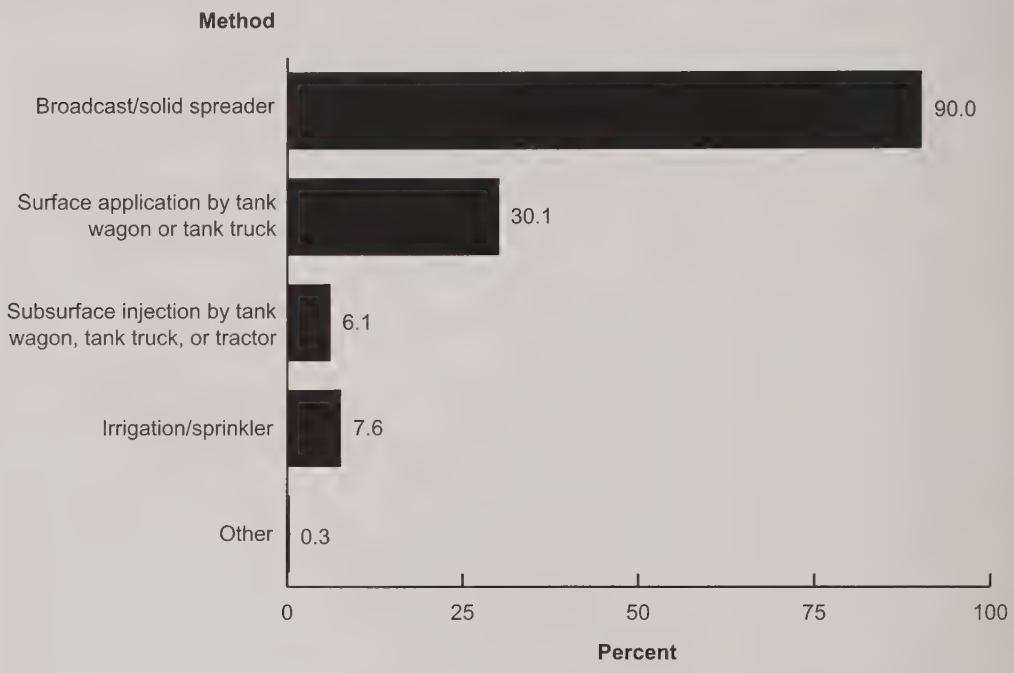
(Note: Tables 5a to 5g represent operations that applied manure to land either owned or rented).

Of operations that applied manure to land either owned or rented, 90.0 percent used broadcast spreaders. Another 30.1 percent used surface application by tank wagon or truck, and a small percentage of operations used irrigation/ sprinkler (7.6 percent) or subsurface injection by tank wagon or truck (6.1 percent).

a. Percentage of operations by manure application method used:

Method	Percent Operations	Standard Error
Broadcast/solid spreader	90.0	(1.2)
Surface application by tank wagon or tank truck	30.1	(1.8)
Subsurface injection by tank wagon, tank truck, or tractor	6.1	(0.8)
Irrigation/sprinkler	7.6	(0.7)
Other	0.3	(0.2)

Percent of Operations by Manure Application Method Used



A nearly equal percentage of operations either never (43.5 percent) or sometimes (42.6 percent) incorporated manure into the soil within 24 hours after application, while only 13.9 percent of operations always or almost always used this practice. Rapid incorporation of manure into soil improves distribution of nutrients, reduces odor, and helps prevent run-off of manure into waterways.

b. Percentage of operations by frequency that manure was incorporated into soil within 24 hours after application, including subsurface injection:

Frequency	Percent Operations	Standard Error
Never	43.5	(2.2)
Sometimes	42.6	(2.2)
Always or almost always	13.9	(1.4)
Total	100.0	

Analysis of the nutrient content in manure prior to its application to land can help determine application rates and frequency. This maximizes the manure's ability to improve soil quality and also helps prevent too much of any one nutrient entering the soil. Overall, a nearly equal percentage of operations analyzed manure for nitrogen (20.9 percent), phosphorus (20.4 percent), and potassium (20.3 percent). As requirements for nutrient management plans become more prevalent, the practice of manure analysis should become more common.

c. Percentage of operations that analyzed manure for the following nutrient contents in 12 months prior to the interview:

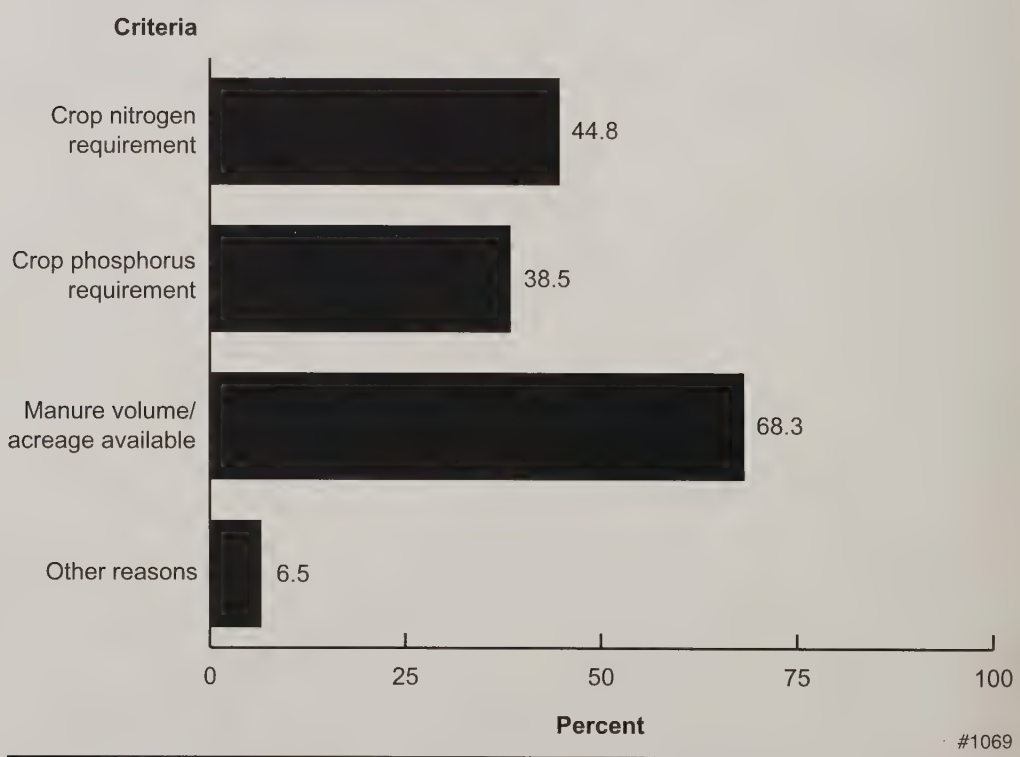
Nutrient	Percent Operations	Standard Error
Nitrogen	20.9	(1.6)
Phosphorus	20.4	(1.6)
Potassium	20.3	(1.6)

Most operations (68.3 percent) used manure volume and available acreage to determine manure application rates. Crop nitrogen or phosphorus requirements were used to determine application rates on 44.8 and 38.5 percent of operations, respectively. Strict attention to crop requirements in combination with analyzing manure for nutrients can prevent misapplication of nutrients and subsequent run-off or leaching of nutrients into the environment.

d. Percentage of operations by criteria for determining manure application rates, either amount or frequency of application:

Criteria	Percent Operations	Standard Error
Crop nitrogen requirement	44.8	(2.1)
Crop phosphorus requirement	38.5	(2.1)
Manure volume/acreage available	68.3	(2.1)
Other reasons	6.5	(1.0)

Percent of Operations by Criteria for Determining Manure Application Rates, Either Amount or Frequency of Application



About two in five operations (39.2 percent) applied manure within 200 feet of a body of water, such as a lake, pond, stream, or river. A similar percentage of operations (37.3 percent) reported that the minimum distance manure was applied from a body of water was 1,000 feet or more. A lower percentage of operations reported the minimum distance to be 200 to 499 feet (16.3 percent) and 500 to 999 feet (7.2 percent). New Federal regulations regarding concentrated animal feeding operations require that manure not be applied within 100 feet of surface water.

e. Percentage of operations by minimum distance (in feet) between application of manure and a body of water, such as a lake, pond, stream, or river:

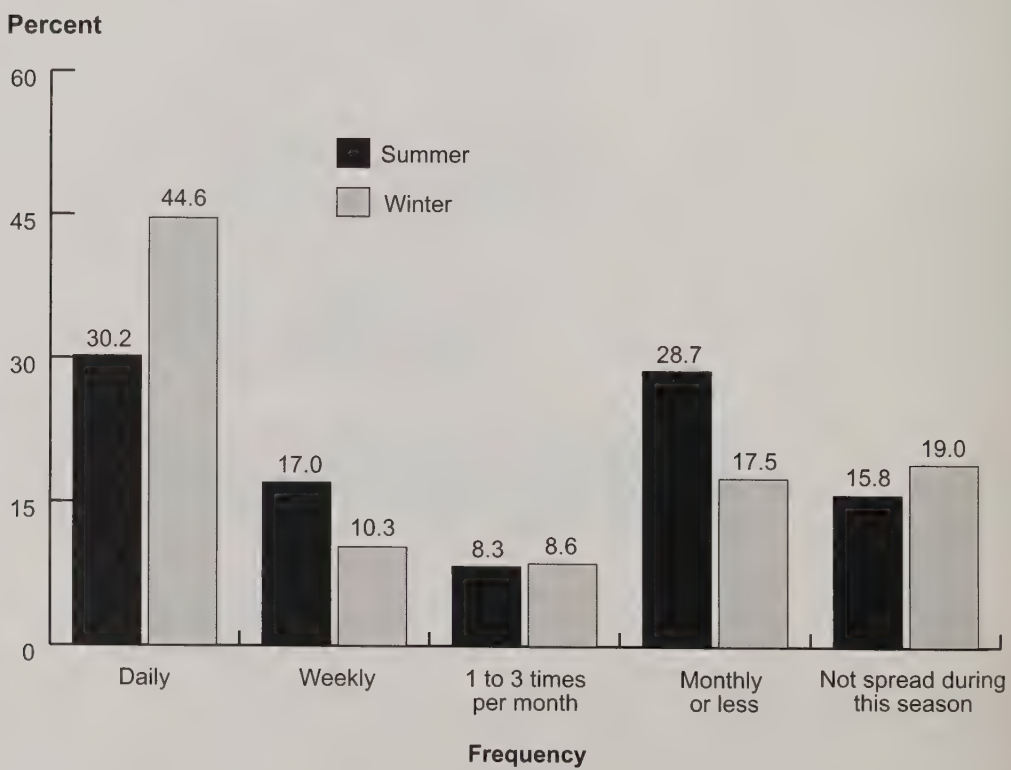
Distance (in Feet)	Percent Operations	Standard Error
Less than 200	39.2	(2.1)
200 to 499	16.3	(1.6)
500 to 999	7.2	(1.1)
1,000 or more	37.3	(2.1)
Total	100.0	

For operations that applied manure, 30.2 percent applied manure daily to land either owned or rented in the summer, and 44.6 percent did so in winter. In summer, manure was applied weekly on 17.0 percent of operations, one to three times per month on 8.3 percent, monthly or less often on 28.7 percent, or not at all on 15.8 percent. In winter, manure was applied weekly on 10.3 percent of operations, one to three times per month on 8.6 percent, monthly or less often on 17.5 percent, or not at all on 19.0 percent.

f. Percentage of operations by frequency that manure was applied to owned or rented land in summer and winter:

	Percent Operations			
	Summer		Winter	
Frequency	Percent	Standard Error	Percent	Standard Error
Daily	30.2	(2.1)	44.6	(2.1)
Weekly	17.0	(1.7)	10.3	(1.2)
1 to 3 times per month	8.3	(1.2)	8.6	(1.2)
Monthly or less often	28.7	(1.8)	17.5	(1.4)
Not spread during this season	15.8	(1.6)	19.0	(1.6)
Total	100.0		100.0	

Percent of Operations by Frequency that Manure was Applied to Owned or Rented Land in Summer and Winter



For operations that applied manure to owned or rented land, 55.6 percent applied manure during the growing season to pasture or hay, 30.6 percent applied manure to forage to be ensiled, 9.0 percent applied manure to other forage, and 9.2 percent applied manure to grain or oilseed crops.

g. Percentage of operations by crops that received manure during the growing season:

Crop	Percent Operations	Standard Error
Pasture or hay	55.6	(2.2)
Forage to be ensiled	30.6	(2.0)
Other forage	9.0	(1.1)
Grain or oilseed	9.2	(1.2)
Other	0.4	(0.2)

6. Knowledge of concentrated animal feeding operations

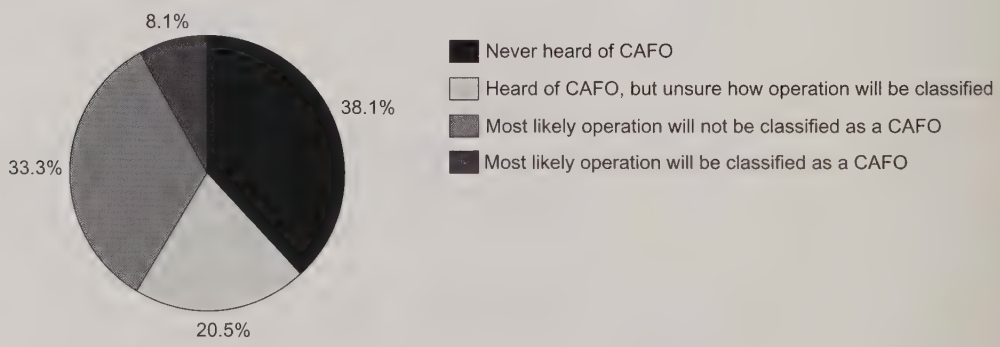
Concentrated animal feeding operations (CAFOs) are defined as agricultural enterprises where animals are kept and raised in confinement. The EPA and the USDA are committed to ensuring that manure and wastewater from these operations are properly managed through the implementation of comprehensive nutrient management plans. When producers were asked how they believed their operation would be classified under CAFO guidelines, 38.1 percent reported never having heard of CAFO, 33.3 percent believed their operation would most likely not be classified as a CAFO, 20.5 percent were unsure how their operation would be classified, and 8.1 percent believed their operation would be classified as a CAFO.

a. Percentage of operations by classification category of their operation regarding Concentrated Animal Feeding Operations (CAFO) under proposed* EPA guidelines:

Classification Category	Percent Operations	Standard Error
Never heard of CAFO	38.1	(2.1)
Heard of CAFO, but unsure how operation will be classified	20.5	(1.8)
Most likely operation will not be classified as a CAFO	33.3	(2.0)
Most likely operation will be classified as a CAFO	8.1	(0.9)
Total	100.0	

*Guidelines enacted since questionnaire administered

Percent of Operations by Classification Category Regarding CAFO Under Proposed* EPA Guidelines



7. Written nutrient management plan

Nutrient management plans are valuable tools that can ensure appropriate storage and use of manure. Operations classified as concentrated animal feeding operations (CAFOs) may be required by State and/or Federal law to design and implement a nutrient management plan. A total of 30.6 percent of operations had a written nutrient management plan.

a. Percentage of operations that had a written nutrient management plan, such as land treatment practices or manure storage structures:

Percent Operations	Standard Error
30.6	(1.8)

For operations with a written nutrient management plan, 81.0 percent had plans developed in cooperation with the USDA Natural Resource Conservation Service, 54.9 percent reported the plans were implemented to satisfy a State regulatory requirement, and 45.9 percent reported the plans were part of a USDA voluntary cost share program.

i. For operations that had a written nutrient management plan, percentage of operations that reported the:

Plan Was...	Percent Operations	Standard Error
Developed in cooperation with the USDA Natural Resource Conservation Service (NRCS) or a local conservation district	81.0	(2.6)
Implemented to help satisfy a State regulatory requirement	54.9	(3.8)
Part of USDA voluntary cost share program	45.9	(3.5)

8. Waste management consultant

Overall, 34.7 percent of operations consulted with an agronomist or crop consultant about waste management during the 12 months prior to the interview. Conservation Service personnel, university/extension personnel, and private nutrient management consultants were consulted on 21.9, 17.2, and 16.0 percent of operations, respectively.

a. Percentage of operations that consulted with the following about waste management for their operation during the 12 months prior to the interview:

Consultant	Percent Operations	Standard Error
University/extension personnel	17.2	(1.6)
Private nutrient management consultant	16.0	(1.4)
Natural Resource Conservation Service personnel (NRCS)	21.9	(1.6)
State or local department of natural resources personnel	10.7	(1.3)
State or local department of agriculture personnel	10.6	(1.3)
Agronomist/crop consultant	34.7	(2.0)
Private veterinary practitioner	5.5	(1.0)
Other	2.1	(0.5)

Section II. Methodology

A. Needs Assessment

NAHMS develops study objectives by exploring existing literature and contacting industry members about their informational needs and priorities during a needs assessment phase. The objective of the needs assessment for the NAHMS Dairy 2002 study was to conduct a national survey to collect information from U.S. dairy producers and other commodity specialists about what they perceived to be the most important dairy health and productivity issues. A driving force of the needs assessment was the desire of NAHMS researchers to receive as much input as possible from a variety of producers, as well as from industry experts and representatives, veterinarians, extension specialists, universities, and dairy organizations.

Focus group meetings were held at various locations across the United States to help determine the focus of the study.

Birmingham, AL October 21, 2000
United States Animal Health Association (USAHA)

Kansas City, MO October 31, 2000
American Feed Industry Association (AFIA)
Dairy Nutrition Committee

Teleconference December 15, 2000
Bovine Association of Management and Nutrition (BAMN)

San Antonio, TX February 4, 2001
American Farm Bureau Federation
Dairy Advisory Committee

Riverdale, MD February 16, 2001
Government Perspective Meeting
APHIS, FSIS, FDA, and ARS

In addition, a short survey asking for rankings of major dairy issues was provided via multiple data collection modes. There were 155 surveys completed via the Web, 90 by hard copy, and 1 completed via telephone.

The focus group meeting input was merged with survey results to determine Dairy 2002 study objectives.

B. Sampling and Estimation

1. State selection

The preliminary selection of States to be included in the study was done in January 2001, using the National Agricultural Statistics Service (NASS), USDA January 28, 2000, Cattle Report. A goal for NAHMS national studies is to include States that account for at least 70 percent of the animal and producer populations in the United States. The initial review of States identified 20 major States with 84 percent of the milk cow inventory and 81 percent of the operations with milk cows (dairy herds). The States were: CA, FL, ID, IL, IN, IA, KY, MI, MN, MO, NM, NY, OH, PA, TN, TX, VT, VA, WA, and WI.

A memo identifying these 20 States was provided in February 2001 to the USDA:APHIS:VS CEAH Director and, in turn, the VS Regional Directors. Each Regional Director sought input from their respective States about being included or excluded from the study. By midyear, Colorado was included, based on the State's interest.

2. Operation selection

The list sampling frame was provided by the NASS. Within each State a stratified random sample was selected. The size indicator was the number of milk cows for each operation. The NASS selected a sample of dairy producers in each State for making the NASS January 1 cattle estimates. The list sample from the January 2001 survey was used as the screening sample. Those producers reporting one or more milk cows on January 1, 2001, were included in the sample for contact in January 2002. Due to the predicted large workload, the sample was reduced in two states (KY and PA), for a final screening sample of 3,876 operations for Phase I data collection. For Phase II data collection, operations with 30 or more dairy cows on January 1, 2002, that participated in Phase I were invited to continue in the study.

3. Population inferences

Inferences for Phase I cover the population of dairy producers with at least 1 milk cow in the 21 participating States. As of January 1, 2002, these States accounted for 85.5 percent (7,792,000 head) of milk cows in the United States and 82.9 percent (80,810) of operations with milk cows in the United States. (see Appendix II for respective data on individual States.) All respondent data were statistically weighted to reflect the population from which they were selected. The inverse of the probability of selection for each operation was the initial selection weight. This selection weight was adjusted for nonresponse within each State and size group to allow for inferences back to the original population from which the sample was selected.

For operations eligible for Phase II data collection (those with 30 or more dairy cows) weights were adjusted for operations that did not want to continue to the study's second phase. This weight was adjusted again for nonresponse to Phase II data collection. The 21-State target population of operations with 30 or more dairy cows represented 97.4 percent of dairy cows and 74.3 percent of dairy operations in the 21 States (see Appendix II).

C. Data Collection

1. Phase I:

General Dairy Management Report, December 31, 2001 to February 12, 2002. NASS enumerators administered the General Dairy Management Report. The interview took slightly over 1 hour.

2. Phase II:

VS Initial Visit, February 25 to April 30, 2002. Federal and State veterinary medical officers (VMOs) or animal health technicians (AHTs) collected the data from producers during an interview lasting approximately 1 hour.

D. Data Analysis

1. Validation and estimation

a. Phase I: General Dairy Management Report

Initial data entry and validation for the General Dairy Management Report were performed in individual NASS State offices. Data were entered into a SAS data set. NAHMS national staff performed additional data validation on the entire data set after data from all States were combined.

b. Phase II: VS Initial Visit Questionnaires

After completing the VS Initial Visit Questionnaires, data collectors sent them to the State NAHMS Coordinators who manually reviewed them for accuracy and then sent them to CEAH. Data entry and validations were completed using SAS.

2. Response rates

a. Phase I: General Dairy Management Report – Screening Questionnaire

Of the 3,876 operations in the screening sample, 410 operations had no milk cows on January 1, 2002, and were therefore ineligible for the NAHMS Dairy 2002 study. Of these 3,466 dairy operations, 2,461 participated in the initial phase of the study. This phase occurred during the period from December 31, 2001, to February 12, 2002, and included the administration of a questionnaire by NASS enumerators.

Response Category	Number Operations	Percent Operations
No milk cows on January 1, 2002	227	5.9
Out of business	183	4.7
Refusal	821	21.2
Survey complete and VMO consent	1,438	37.1
Survey complete, refused VMO consent	905	23.3
Survey complete, ineligible for VMO	118	3.0
Out of scope (prison, research farm, etc.)	45	1.2
Unknown (code 8)	2	0.1
Inaccessible	137	3.5
Total	3,876	100.0

b. Phase II:

VS Initial Visit response categories are shown below for all 1,438 producers turned over to VS with 30 or more dairy cows. Of these, 1,013 producers participated.

Response Category	Number Operations	Percent Operations
Survey completed	1,013	70.4
Producer not contacted	76	5.3
Poor time of year or no time	161	11.2
Did not want anyone on operation	4	0.3
Bad experience with government veterinarians	0	0.0
Did not want to do another survey or divulge information	136	9.5
Told NASS they did not want to be contacted	6	0.4
Ineligible (no dairy cows)	14	1.0
Other reason	28	1.9
Total	1,438	100.0

Appendix I: Sample Profile

A. Responding Sites

1a. Number of responding operations, by herd size

	Phase I: General Dairy Management Report	Phase II: VS Initial Visit
Herd Size (Dairy Cow Inventory, January 1, 2002)	Number of Responding Operations	Number of Responding Operations
Less than 100	1,131	400
100 to 499	820	392
500 or more	510	221
Total	2,461	1,013

1b. Number of responding operations, by region

	Phase I: General Dairy Management Report	Phase II: VS Initial Visit
Region	Number of Responding Operations	Number of Responding Operations
West	525	208
Midwest	1,085	448
Northeast	596	278
Southeast	255	79
Total	2,461	1,013

Appendix II: US Milk Cow Population and Operations

Region	State	Number of Milk Cows on January 1, 2002[1] (Thousand Head)			Number of Operations 2001		
		Milk cows on operations with 1 or more head	Milk cows on operations with 30 or more head	Percent 30 or more head	Operations with 1 or more head	Operations with 30 or more head	Percent 30 or more head
West	California	1,620	1,618.4	99.9	2,500	2,200	88.0
	Colorado	93	92.0	98.9	800	220	27.5
	Idaho	377	375.5	99.6	1,000	770	77.0
	New Mexico	290	289.4	99.8	500	165	33.0
	Texas	310	306.9	99.0	2,100	1,150	54.8
	Washington	247	246.3	99.7	1,000	700	70.0
	Total	2,937	2,928.5	99.7	7,900	5,205	65.9
Midwest	Illinois	115	111.6	97.0	1,900	1,420	74.7
	Indiana	154	140.1	91.0	2,900	1,400	48.3
	Iowa	205	194.8	95.0	3,500	2,680	76.6
	Michigan	297	282.2	95.0	3,300	2,250	68.2
	Minnesota	500	480.0	96.0	7,800	6,700	85.9
	Missouri	140	133.0	95.0	3,700	2,100	56.8
	Ohio	260	236.6	91.0	5,200	2,800	53.8
	Wisconsin	1,280	1,232.6	96.3	19,100	15,950	83.5
	Total	2,951	2,810.8	95.2	47,400	35,300	74.5
Northeast	New York	675	661.5	98.0	7,200	5,900	81.9
	Pennsylvania	588	564.5	96.0	10,300	8,500	82.5
	Vermont	154	152.5	99.0	1,600	1,470	91.9
	Total	1,417	1,378.4	97.3	19,100	15,870	83.1
Southeast	Florida	152	151.4	99.6	510	220	43.1
	Kentucky	125	115.0	92.0	2,900	1,600	55.2
	Tennessee	90	87.8	97.6	1,500	870	58.0
	Virginia	120	116.4	97.0	1,500	1,010	67.3
	Total	487	470.6	96.6	6,410	3,700	57.7
Total (21 States)		7,792 (85.5% of U.S.)	7,588.3 (85.5% of U.S.)	97.4	80,810 (82.9% of U.S.)	60,075 (86.6% of U.S.)	74.3
Total U.S. (50 states)		9,111.6	8,874.7	97.4	97,510	69,385	71.2

[1] Source: NASS Cattle, January 31, 2003 – (revised January 1, 2002, number of milk cows and number of operations in 2001 with milk cows). An operation is any place having one or more head of milk cows, excluding cows used to nurse calves, on hand at any time during the year.

Appendix III: Study Objectives and Related Outputs

1. Describe baseline dairy cattle health and management practices and trends in dairy farm health management.
•Part I: Reference of Dairy Health and Management in the United States, 2002
•Part II: Changes in the United States Dairy Industry, 1991-2002
•Part III: Reference of Dairy Cattle Health and Health Management Practices in the United States, 2002
•Colostrum and bST info sheets, December 2002
•Mycoplasma and HBS info sheets, June 2003

2. Describe strategies to prevent and reduce Johne's disease.
•Johne's Disease on United States Dairy Operations, 2002, expected winter 2003

3. Evaluate management factors associated with the presence of certain food safety pathogens.
•Milking Procedures, *E. coli, Salmonella* and *Campylobacter,* and Food Safety Pathogens Bulk Tank info sheets, December 2004

4.Describe the preparedness of producers to respond to foreign animal diseases, such as foot and mouth disease.
•Info sheets, expected winter 2004

5. Describe waste handling systems.
•Interpretive report, expected winter 2004